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ONE of the most important electrical power transmission plants in existence is that lately completed at Tivoli, in Italy, where some 2,700 horse power is generated by turbines and carried by wire 17 miles to Rome, where it is used at present for lighting only, although arrangements are being made for power distribution also. At Tivoli there is a total fall of 360 feet, and a water supply of 130 cubic feet per second can be relied on; at some seasons it is greater. The power is obtained from Girard turbines running at 170 revolutions and driving the dynamos directly. The transmission lines are made up of four cables carrying copper wires, and the current is delivered to the transformers with a loss of about 20 per cent. The results obtained with the new plant have been so far very good. Without a further knowledge of the details it is not easy to criticise, but with the head and supply of water it seems very probable that better results would be obtained with impact wheels than with the turbines, and at a somewhat lower first cost of plant.

IN the April number of the *Popular Science Monthly* there is an article on "Traces of a Vanished Industry," which describes in a graphic way the ruins of the old furnaces and forges in which many years ago the bog iron ores of Southern New Jersey were worked. A somewhat similar state of affairs may be found in the Northwestern part of the State, where the ruins of old forges may be found scattered all over Sussex and the greater part of Morris and Warren counties. Some of these old forges are in complete ruins, but in a few the old trip-hammers and blowers still remain. In many cases the water-powers have been utilized to run saw or grist mills or small factories on the sites of the old works. The last of the forges in active operation, to our knowledge, was at Snufftown, in Sussex County, where iron was turned out as late as 1888, the blooms being shipped to New York for use in making anchors. There is this difference, however, that the South Jersey forges were abandoned on account of the exhaustion of the bog ore deposits, while in North Jersey they were simply superseded by improved methods, since many of the iron mines of that region are still in active operation. The old forge was more picturesque, perhaps, but less economical than its modern successor.

THE resignation of the presidency and the receivership of the Reading company by Mr. MCLEOD, which was announced on April 5th, has caused little or no surprise, as it was already understood that some of the strongest financial elements interested in the company had lost confidence in his policy, and were opposed to any plan of reorganization under his management. His retirement will probably lead to at least a partial change in the course which hastened the bankruptcy of the company; it can hardly be said to have caused it, since the failure was sure to come sooner or later. Valuable as the property and position of Reading are, no one who really understands the situation has ever expected the company to stand long under the load left upon it by the reorganization which followed the first collapse under the GOWEN management. Just what the change of policy may be it is too early to say, but there is little doubt that some of the ambitious plans of the late president will be given up, and that the present combination to control the anthracite coal trade will be considerably modified in form. It is not impossible that an element friendly to the Pennsylvania Railroad will have hereafter a voice in the Reading councils, and perhaps an influential one.

The Reading has been singularly unfortunate in its presidents of recent years. The late FRANKLIN B. GOWEN, who was for so long the head of the company, was an able, ambitious and brilliant man, but his plans for making a great company out of the corporation under his control ended in bankruptcy and the practical destruction of the stockholders' property in the concern; while Mr. MCLEOD, equally ambitious, but perhaps less able than his predecessor, has again brought the company to disaster. The stockholders may in time learn to prefer a safe to a "brilliant" management; or, if it is too late for them to save anything, the bondholders may insist upon such action.

THE Atlantic copper mine, Michigan, we believe the most economica copper mine in the world, has surpassed its own record. The earning of $42,681, net, from the treatment of 300,000 tons (of 2,000 lbs.) of ore carrying only 12·31 lbs. of fine copper per ton of ore, or 0·615 per cent., is a wonderful result.

When it is considered that the total cost of mining, sorting and all expenses in and around the mine was only 84 cents per ton; that the ore was loaded and transported three miles from the mine to the mill and unloaded at a cost of 1·1 cents per ton per mile (3·3 cents per ton); that the cost of stamping and concentrating was only 25 cents per ton, and that the total expenses of the company, mining, concentrating, refining the copper and sending it to market, 1,500 miles from the mine, selling it, and the general office expenses of the company aggregated only $1.33½ per ton of rock treated, and all this while paying wages which considerably exceeded $2 a day as an average of the entire force employed, the result must be considered as wonderful and an example of skillful and economical work that we believe cannot be equaled in any other part of the world. These results reflect the very highest credit upon the ble young manager of the mine, Mr. F. MCM. STANTON.

How the cost has been reduced at this and other Michigan copper mines within the past thirty-five years, and what the items of cost have been year by year, is given in full detail in the great volume *The Mineral Industry*, now in the binder's hands, and which will be ready for delivery in a few days. In this work the reduction in cost is shown to be due to greater knowledge and experience, to improvements in machinery and explosives, to reduction in cost of supplies, but not to have depended on the rates of wages, which have rather increased, while cost of production diminished, for the condition of the workmen has greatly improved in the past quarter of a century.

WHEN we (July 16th, 1892) called attention to the Palmarejo Mining Company, Limited, as an example of how not to work a mine, we were accused of "deliberate misrepresentation." Briefly stated, the condition of affairs was as follows: The company was formed in London in 1886 to work a group of mines in Chihuahua, with a working capital of £100,000. For the property, which was not new and which had been offered for less than $300,000 to Americans, who refused to purchase it after an examination, the English company paid £200,000 in cash and £100,000 in fully paid up stock.

When it was found that no water, except at a distance of twelve miles, could be obtained to run a mill the Mexican Mineral Railway was started, the Palmarejo company subscribing £150,000 and guaranteeing 7 per cent. interest on the bonds and an 8 per cent. stock dividend. Still later, these funds were found insufficient, and £150,000 more were raised on debentures, the stockholders subscribing on the strength of favorable reports from the mine.

Finally, in April last, the railroad, mill and water ditch were completed, but, unfortunately for the English stockholders, the railroad was a complete failure, and there was only enough water to run five stamps at the mill. Further calls for money were the result. This was the condition when we last referred to this enterprise and expressed an unfavorable opinion of it. Now comes the last page, in all probability, of the company's history. In January of this year debentures to the amount of £25,000 were offered, more capital being needed, but the stockholders evidently had enough of promises, for only £8,620 were subscribed. After raising £600,000, the stockholders lacked the confidence to subscribe a paltry £25,000, and the directors have made a final appeal to the stockholders for help, the plan being to issue 50,000 new 10% cumulative preference shares of £1 each at par, each subscriber to have the right of converting four of the existing ordinary shares into four preference shares for every preference share subscribed for. If the entire issue is taken up the new preference capital will amount to £250,000 and the ordinary capital will have been scaled down £200,000. If this plan is successful, which we doubt, the company must earn £37,420 annually to pay interest on preference shares and on debentures. The showing is bad for the ordinary shares, and the stockholder who cannot afford to risk more deserves sympathy. It is hinted that if the scheme be not adopted the company will have to be reconstructed and assessments levied, the liabilities amounting to £49,140, for which the company must provide; this sum includes £17,000 interest, rent, and current expenses which were due September 1st, 1892.

BIMETALISM AND AN INTERNATIONAL MONETARY CLEARING HOUSE.

Judging from the reported opinions of European statesmen, the question of another meeting of the Monetary Conference depends absolutely on the preliminary formulation by the United States of some rational plan for the solution of the silver problem. It would be quite useless to ask for a conference to discuss nothing, as was done at Brussels, where no plan was proposed that could by any stretch of courtesy be construed as a solution of the problem. The time is now opportune to discuss the subject and to elucidate the plan proposed by the ENGINEERING AND MINING JOURNAL, and which, in brief, signifies:

1. The acceptance by the nations of the principle of bimetalism.

2. The adoption, for the management of national monetary transactions of the well-understood and universally approved clearing house methods.

3. The appointment of an expert international commission (this Clearing House) with power to settle the working details of the plan, such as the value-ratio between gold and silver, the determination of changes in this ratio which changed conditions of production may render necessary; the manner of apportioning the metals purchased among the nations; the rules governing the Clearing House, and other questions. These can be settled more intelligently and more justly by a permanent commission composed of the ablest experts of all nations who devote themselves specially to this subject, than they can ever be settled by the legislating members of the individual governments, who, we know, are often influenced by political prejudices or personal interests, influences that would necessarily disappear in a permanent commission representing the highest intelligence, the best expert knowledge and the general interests of all the nations.

It was admitted by the representatives at Brussels, and is recognized by every intelligent authority to-day, that the threatened universal demonetization of silver and the heavy decline in its value have caused enormous losses throughout the world, and if continued will bring disaster and bankruptcy on a large part of the world. So closely are the interests of peoples knit together that the bankruptcy of India or Mexico would be felt perhaps more severely by the factory workers and the middle classes in England than by the natives whose present primitive conditions of existence cannot be greatly lowered. It is the interruption of orders for goods from these bankrupt people that would close the factories of Great Britain, and the inability to pay the interest on their government and industrial security, held so largely by the middle classes of England, would bring home to the gold basis countries the injury so many in them now imagine would be confined to those nations that have only silver.

The United States, so rich and prosperous in supplying its own needs, and so little interested in the securities and in the commerce of foreign countries, would suffer less than any other nation from a financial panic or disaster. We can therefore discuss this question of such infinite importance from an impartial and comparatively disinterested standpoint.

The plan we propose, and which is repeated here, as originally made, is intended to solve definitely the vexed problem to the benefit of all and to the injury of none. If, as the advocates of gold contend, the production of silver should continue excessive at the ratio adopted at the start, say 20 to 1, then this expert Clearing House Commission will make the ratio 21 to 1, or in time may keep changing slowly and by small amounts this ratio, until an equilibrium in production be established.

If, on the other hand, the advocates of silver should prove to be correct, and the metal would not be dangerously over-produced at the ratio adopted, its relative value would be gradually increased. In each case the loss would fall very gradually on the whole world, not on the individual holder of the metal or certificate therefor, and no derangement of trade, no panic, no financial disaster could occur. The whole world would stand the depreciation.

What would signify the loss yearly of a small fraction of one per cent. on all the silver in the world, when distributed over the whole, as compared with the infinite benefits of stable values, absolute freedom from financial disaster, from panics and from the losses due to violent fluctuations in the value of money, which we are now suffering or are threatened with.

The adoption of an international monetary clearing house would moreover bring its own advantages altogether irrespective of the settlement of the silver question.

We invite criticism and expressions of opinion, *pro* or *con*, on this plan, and shall continue this discussion in succeeding numbers of this JOURNAL.

The plan proposed is as follows:

The appointment by the nations of an international monetary clearing house, with powers:

1. To ascertain, periodically, the amount of money, that is, of gold, silver and uncovered notes, held by each country during the preceding one or two years. These amounts to form the basis for the proportions in which the several nations will join in the purchase of all silver offered.
2. To clear every national transaction in the purchase or sale of money.
3. To purchase, for common account, such an amount of silver (say 25 per cent. of their holdings) from each of the silver basis countries as is necessary to put it on the gold or bimetallic basis.
4. To issue international certificates, redeemable in gold or silver, at holder's option, for the gold and silver purchased.
5. To determine from time to time, say at intervals of 5 or 10 years, what, if any, change in the value-ratio of gold and silver is called for by the changed conditions of production.
6. To publish the transactions of the monetary clearing house daily or weekly.

This clearing house to be composed of one or more representatives of each country, and to act through the mints of the several countries as depositories, and to have a central clearing house at one of the capitals.

A NEW GROUPING FOR PIG IRON AND OTHER STATISTICS.

The system heretofore adopted for presenting the statistics of the production of pig iron has been based on the fuel employed. Thus we have had anthracite, charcoal and coke and bituminous. It has been used for a number of years, chiefly because none other has been proposed, but is open to the objection that it does not conform to the system used in the statement of the output of coal, and has no logical connection with the geographical divisions of the country. If it were brought into harmony with the system adopted by the Census Bureau for coal it would be possible at a glance to see what relation the output of these two great industries bore to each other in the different parts of the United States, and to judge of the progress or retrogression of geographical divisions.

The system adopted for coal is to classify the output under seven heads, which, in alphabetical order, are: Appalachian, Central, New England, Northern, Pacific Coast, Rocky Mountain and Western. In some respects this is arbitrary, but so must any system be which includes all parts of a country so large and of such diversified geographic features. It is as good a system as can be devised, and should be used in the statement of all of our natural products and also of our manufactures.

In giving the output of coal, for instance, some states are included which would be omitted in the pig iron table, and *vice versa*. Many states engage in the manufacture of pig iron which do not make steel, etc. But on the whole, there would be far less confusion with the use of a system already shown to be applicable than in continuing the present unsatisfactory grouping of pig iron solely by fuel.

The fuel system could easily be incorporated in the other, just as the two grand sub-divisions of anthracite and bituminous coal are incorporated in the coal statistics.

We suggest, therefore, the following scheme, which corresponds closely to the system already in use for coal:

1. Appalachian Region, comprising North Appalachian, or New England; Middle Appalachian, or New York, New Jersey, Pennsylvania, Delaware, Maryland and Ohio; and South Appalachian, or Virginia, West Virginia, Eastern Kentucky, North Carolina, Tennessee, Georgia and Alabama.
2. Central Region, comprising Illinois, Indiana and Western Kentucky.
3. Northern Region, comprising Michigan, Minnesota and Wisconsin.
4. Pacific Coast Region, comprising California, Oregon and Washington.
5. Rocky Mountain Region, comprising Colorado and Utah.
6. Western Region, comprising Missouri and Texas.

If in the future any other states should enter upon the manufacture of pig iron they would fall naturally into their appropriate groups—Arkansas, for instance, in the Western; Dakota in the Rocky Mountain Region, etc.

The same grouping could very well be used for iron ore and coke, for steel and all other manufactures of finished material, so that in a very short time one could acquaint himself with the industrial condition of the country by great divisions. It lends itself also to the statistics of kinds of ore produced, so that the Appalachian Region can be compared with the Northern, and the different sub-divisions of the Appalachian with each other. In order to show how convenient a grouping of this sort would be, we submit the statistics of coal, iron ore and pig iron for the year 1891, arranged under the proposed head, as the returns for 1892 in regard to iron ore are not yet complete. It will be seen that the plan recommended has this great advantage, that it enables one at a glance to fix in his mind the relations subsisting between these three great industries and to know where they are being developed.

PRODUCTION OF COAL, IRON ORE AND PIG IRON IN 1891 BY DISTRICTS. GROSS TONS.

District.			Pig iron.			
Appalachian.	Coal.	Iron ore.	Anthracite.	Charcoal.	Coke.	Total.
a. Northern.....	12,4·2	78,425	....	30,8o0	....	30,800
b. Middle.....	99,902,115*	2,957,622	1,866,108	49,932	3,652 303	5,518,403
c. Southern.....	16,056,905	3,530,923	.....	146,565	1,420,339	1,566,904
Total.....	115,971,502	6,56i,970	1,866,108	227,357	5,022.642	7,116,107
Central.....	17,939,470	....	.....	.....	676,930	676,930
Northern..... ...	36,000	7,661,689	.....	307,249	104,282	411,531
Pacific Coast.....	1,672,659	29,018	.. ..	9,296	.....	9,296
Rocky Mountain..	6,469,381	175,654	.....	.....	18,116	18,116
Western.....	9,853,793	157,919	.....	33,062	14,828	47,890
Grand total....	151,342.805	14,591,280	1,866,108	576,964	5,836,798	8,279,870

*Pennsylvania anthracite 45,237,000.

Practically all of the anthracite coal comes from Pennsylvania, so that a footnote giving its amount is sufficient, instead of an extra column. The form of this table is very convenient for summing up the returns, if it be desired to express in detail the output by States, and as far as possible by kinds. It is easy to add the names of the States, the only result being to extend the table. The grouping for iron ore and pig iron has already been given and the States that fall into the several groups.

For coal the grouping would be the same, with mention of the States in which coal is produced. Thus, in the North Appalachian we would have the New England States of Massachusetts and Rhode Island, some 14,000 tons of very refractory anthracite coal being produced from the coalfields of the eastern edge. In Middle Appalachian we have Pennsylvania, Maryland and Ohio. In Southern Appalachian, Virginia, West Virginia, Eastern Kentucky, North Carolina, Tennessee, Georgia and Alabama. In the Central Region we would have Illinois, Indiana, and Western Kentucky. In the Northern Region, Michigan. In the Pacific Coast Region, California, Oregon and Washington. In the Rocky Mountain Region, Colorado, Dakota, Montana, New Mexico, Utah and Wyoming. In the Western Region, Arkansas, Indian Territory, Iowa, Kansas, Missouri, Nebraska and Texas.

The division of Kentucky into Eastern and Western is made because the eastern part of the state belongs to the Appalachian field, and the western to the Central. The production of coal is very nearly the same in the two parts, the difference being in favor of the western part, while at the present time all the iron ore and pig iron is to be credited to the eastern part.

In a study of coal, iron ore and pig iron which we are about to undertake in the pages of this journal we shall use the system here outlined, as we believe it has many advantages over any other that has been proposed. It has at least those of consistency and system, which are entirely lacking in the present method of giving the statistics.

NEW PUBLICATIONS.

CATALOGUE OF AMERICAN LOCALITIES OF MINERALS. By Prof. Edward S. Dana, of Yale College. Being a reprint from the Sixth Edition of Dana's "System of Mineralogy." New York: John Wiley & Son's. 1893. 51 pages. Price $1.

Collecting mineralogists will welcome this reprint of the list of American localities given in Dana's standard work on mineralogy. Although essentially historical, in that it gives many localities now exhausted or at which specimens can now be obtained only at great expense, the arrangement is such that no difficulty is experienced in distinguishing the quality of specimens to be obtained at any given locality; the names of minerals obtained in good specimens being distinguished by italics and when remarkably good by an exclamation point.

A REPORT ON THE MINERAL WATERS OF MISSOURI. By Paul Schweitzer. Being Vol. III. of the Missouri State Geological Survey Arthur Winslow, State Geologist, Jefferson City, Mo. Published by the Geological Survey. 1892. 256 pages. Illustrated, and one colored map.

In his letter of transmittal, Mr. Winslow defines the aim of the investigation and preparation of this report as: (1). To determine the composition and character of the waters and their values as compared with other waters which have acknowledged medicinal virtues. (2). To furnish an exact and full statement of the results reached, particularly for the use of physicians. (3), To supply certain suggestions for the guidance of the citizens of the State in the use of these waters, and (4) To make the fact of the existence of these waters authoritatively known with the object of interesting others in developments and improvements at the different localities. Whether these aims lie properly within the functions of a geological survey may well be doubted, and that such doubts have been entertained by others than ourselves is made patent by the preface of the author, Mr. Schweitzer. He says "to prepare a report on the mineral waters of the State that would call attention to their variety and value without seeming a mere advertisement; that would give reliable information concerning their character without being too concise or too technical; that would be useful and acceptable to the people without giving up its scientific purpose of adding to our knowledge of the geologic history of the State, was the problem to be solved."

So far as we know, no other geological survey has issued a similar report, nor is it probable that any will follow the example of the Missouri organization.

We have before had occasion to speak of certain of the work performed by the United States Geological Survey as being foreign to its domain and contrary to the intent of its organization. Such is the work before us. It is well prepared and contains some valuable information, and we have no doubt will prove useful to and be highly appreciated by not only the citizens of Missouri, but of other States as well, but we see no reason why the greater part of the book should not have been prepared and published by the State Board of Health whose province it is to concern itself with the health of the people.

The waters of the State are classified as muriatic, or those containing common salt as their chief constituent; alkaline, or those containing sodium or magnesium carbonate; sulphatic, or those containing one or more sulphates as the chief constituent; chalybeate, containing ferrous carbonate and sulphur water, containing sulphides and other thio-compounds.

Besides tables of analyses the book contains descriptions of various springs, hotel and other accommodations, many of which are illustrated, doses to be taken and the diseases for which each particular water is said to be beneficial. It contains an excellent chronologically arranged bibliography of mineral waters.

REPORT ON THE IRON ORES OF MISSOURI. By Frank L. Nason, Assistan Geologist, Jefferson City, Mo. Published by the State Geological Survey. 334 pages, with map and 62 illustrations.

The iron ore area of Missouri is calculated at 30,000 sq. miles, or 43·3% of the total area, and the total production of ore to the close of 1892 is given at 7,715,124 tons, valued at $30,050,612. The production last year was 301,785 tons less than it was in 1887, and reached the lowest point in the history of the industry since 1880; probably the lowest since 1870.

There are now in the State 5 coke furnaces in blast, and 3 out; 3 charcoal in, and 8 out of blast. The production of pig iron last year was 28,968 tons of coke and 28,052 tons of charcoal, while in 1887 it was 87,403 tons of coke and 36,386 tons of charcoal iron, showing a reduction in total output of pig iron since 1887 from 123,789 tons to 57,020 tons. The diminishing output of ore, which was evident two years ago, induced the Geological Survey to undertake a careful examination of the iron ore belts in the hope of rehabilitating an industry of so much importance. In 1854 the Iron Mountain and Pilot Knob deposits were described by Dr. Litton. Dr. Adolph Schmidt, under the Pumpelly Survey of 1872, carried the investigation still farther and included the ores of the porphyry region, the specular ores held in sandstone, the limonites held in limestone and the hematites. Finally, the limonites of the southeastern part of the State were described in the Broadhead report of 1873-74. Here the matter rested until it was taken up under the present Winslow survey, and put in charge of Mr. Frank L. Nason in 1891. The volume now before us contains the results of his work during two field seasons, and is a careful, laborious and valuable contribution to the subject. Mr. Nason groups the Missouri ores under the following heads: Specular ores of the porphyry region, as Iron Mountain and Pilot Knob; specular ores of the sandstone region, as Simmons Mountain and Cherry Valley; red hematites, as those of Benton, Henry, St. Clair County, etc.; limonites, including bog ores, as those of the Ozark district; carbonates, of the coal measures. He concludes the chapter on the specular ores of the porphyry region with the remark that there is very little hope of finding new and large veins of ore in the solid porphyry hills, but that abandonment of the district should not be decided upon before the limestones and sandstones on the flanks of the mountains are thoroughly prospected. He thinks it probable that beneath the Silurian rocks in the porphyry valleys deposits of ore may still be found.

Missouri was probably the first State west of Ohio to begin the mining of iron ore and the manufacture of iron, for Ashebran's furnace was in operation in 1815 or 1816. Mining operations at Iron Mountain began in 1844, and have been continued there ever since, but unless new discoveries of ore are made it will soon be practically worked out. The output from this mine up to the end of 1891 was 3,349,086 tons; the maximum was reached in 1872 with 269,480 tons, but the production in 1892 had fallen to 78,969 tons. Pilot Knob attained its maximum in 1887, but in eight months of 1892 the output was only 4,942 tons. Ore was first mined at Pilot Knob in 1848, and the total production of ore up to the end of 1891, including Shepherd and Cedar Mountains, was 1,606,600 tons.

BOOKS RECEIVED.

In sending books for notice, will publishers, for their own sake and for that of book buyers, give the retail price? These notices do not supersede review in another page of the Journal.

The People's Money. By W. L. Trenholm. New York: Charles Scribner's Sons. Pages, 280.

Proceedings of the Alabama Industrial and Scientific Society, Volume II., 1892. Published by the Society.

Patentable Inventions. By Edward S. Renwick. Rochester, N. Y.: The Lawyers' Co-operative Publishing Company. Small 8vo., 156 pages; price $2.

General Specifications of Wiring for Electric Light in Buildings. By Robert A. Cummings. Columbus, O.; R. A. Cummings. Pamphlet, 12 pages. Price 25 cents.

Bulletin of the Geological Society of America: Comparison of Pleistocene and Present Ice Sheets. By Warren Upham. Rochester, N. Y.: Published by the Society.

Traite de Topographie. Par A. Pelletan, Ingenieur-en-Chef des Mines. Paris, France: Baudry & Cie. Pages, 384; illustrated. Price (delivered in New York), $5.25.

Third Annual Report of the State Chemist of Florida for the Period Ending December 31st, 1892. Norman Robinson, State Chemist, Tallahassee, Fla., State Printer.

Locomotive Boiler Construction. By W. F. Dixon. Paper read before the New York Railroad Club, with discussion on the same. New York: Published by the Club. Pages 28; illustrated by diagrams.

CORRESPONDENCE

We invite correspondence upon matters of interest to the industries of mining and metallurgy. Communications should invariably be accompanied with the name and address of the writer. Initials only will be published when so requested.
All letters should be addressed to the MANAGING EDITOR.
We do not hold ourselves responsible for the opinions expressed by correspondents

Deterioration of Copper Wires Under Ground.

EDITOR ENGINEERING AND MINING JOURNAL:

Sir: In reading a copy of your valuable journal of March 11th, I noticed a query by E. W. on the deterioration of copper wires under ground, and would like to give some experience in our own business—a knowledge of which may be of some value to your readers.

I have noticed in the terminals of the storage batteries, which we manufacture, a deterioration of the metallic terminal at the positive pole of the battery, or, more strictly speaking, that terminal which is connected to the positive terminal of the dynamo in charging a secondary battery. In all cases a copper wire attached to the aforesaid terminal quickly deteriorates, while a copper wire on the negative terminal remains in good condition for any length of time. This also refers to the metallic lead, of which the terminal and positive electrode is constructed, and is the cause of the depreciation of a secondary battery. The lead rapidly approaches the crystalline condition, or, as your correspondent terms it, "rotten," breaking as easily as a piece of charcoal; while the metal of which the negative electrode is composed retains its malleability and suffers apparently no depreciation. The action on the copper wire is much more rapid if it is exposed to the influence of dampness or water, slightly impregnated with acid.

LOWELL, Mass., March 25th. ALFRED CLARKE.

The Use of Burnt Lime in Lead Blast Furnaces.

EDITOR ENGINEERING AND MINING JOURNAL:

Sir: I consider that there is another advantage, yet more potent, than those mentioned by Mr. Bretherton in the Engineering and Mining Journal of March 4th, 1893, as favoring the use of burnt lime instead of limestone in the lead furnace. It was discovered in the manufacture of pig iron that the carbonic acid—or carbon dioxide, as the more pedantic prefer to call it—produced in the lower part of the blast furnace was reduced to carbonic oxide on coming in contact with moderately heated coke in the middle and upper portions. This reaction produces a great waste of fuel, the coke being, as it were, dissolved in the constant stream of gas, without producing any heating effect. The reaction in the lead furnace is doubtless the same. Carbonic acid, derived in part from the decomposition of the limestone, rising through the heated charge and coming in contact with the coke, presumably exercises the same effect, abstracting a portion of the fuel and becoming reduced to carbonic oxide, which, as there is no excess of free oxygen to consume it, passes away through the flues and is lost.

I would not like to appear hypercritical, but Mr. Bretherton really must figure things more accurately, else he will have "freeze-ups." With the data he assumes in his imaginary case, it appears to me that he would require 189 lbs. of burnt lime instead of 161 lbs. to flux his 839 lbs. of ore.

MINERAL, Idaho, March 14, 1893. HERBERT LANG.

The Russell Process at Sombrerete, Mexico.

EDITOR ENGINEERING AND MINING JOURNAL

Sir: In reference to the article in your journal of December 24th, concerning the mines of Sombrerete, several statements are made to which many people familiar with the subject would, I think, take exception. But I beg space from you to say something only about the metallurgical features of Sombrerete in the past, about which your correspondent is not entirely clear.

The "old mill" of Sombrerete was practically a roll mill, as rolls did at least 90% of the work; a Tustin mill being used only to regrind jig products to a size suitable for chloridization. Although badly arranged, the crushing and grinding cost at this mill was small, and was no item of importance to justify the erection of the new Santa Rosa mill.

The old concentrator produced lead concentrates, of about 100 oz. average value, which were shipped to the El Paso smelters, and by-products, consisting of slimes, running 30 to 70 oz., and iron concentrates running about 40 oz. Over half the value of the ore was contained in these by-products, too poor to ship and too base to amalgamate. Leaching was introduced to treat these, the mill finally having a capacity of 16 tons daily. For some time this arrangement was followed, until the lead contents of the ore running down it was found more economical to crush and leach the ore direct, which had been previously hand-sorted roughly; to throw out the waste and to separate any bunches of galena, which from time to time were found in the mine. For the last year of the old mill's run but a small amount of galena was shipped direct.

By the usual way of calculating efficiency simply from the percentage of chloridization the old reverberatory furnaces might be called efficient. But going into the subject thoroughly, as was done during the last two years of their run, it was found that the volatilization loss was very heavy. The last six months' average was 16·6%, and before, it had risen as high as 24%.

(All results quoted here are on daily assay by the usual Colorado scorification method.)

The resulting chlorination (taking last six months' average) was 88·5%, which may be considered fair on an ore running roughly 10% blende, 10% galena, 30% iron pyrites, and the rest mostly quartz, containing an average of about 20% sulphur. By considering the two losses we can say that the efficiency of the old reverberatories, on this ore, was 73·8%, which many engineers would judge far from good. The extraction in "sulphides" during this time was about 73%, and the total cost including grinding was about $8, Mexican currency, per ton.

Refining these "sulphides" should never have been done on the spot, for they contained 25 to 35 oz. of gold per ton, which gold was never allowed for by the Mexican mints, as the bullion's gold contents was below the minimum for gold payment, and this gold contents would always pay expressage to and refining at Denver.

A different style of mill was required for the following metallurgical reasons: First and principal: On account of the high volatilization loss, due to the 24 hours' roast in the old furnaces. Second. On account of the large number of skilled roasters required, should a 100-ton plant be put up, using reverberatories? This would require on Sombrerete ore 175 to 200 skilled hands, a number which in that district would make the management dependent on their caprices. O'Hara furnaces were advocated, but at that time they had not been improved to their present mechanical efficiency, and the volatilization loss would be practically the same in O'Hara's as in the regular hand-reverberatory. On account of the known small "roasting" loss the Stetefeldt furnace was adopted. The Russell process was only to be used in case the old ordinary solution failed to do good work, but the leaching department and that only was put in from designs by the Russell Process Company.

Your correspondent says a carload lot of ore was treated at the Ontario mill by the Russell Process Company. This is a misstatement, as, although the management was urged to do so no such lot of ore was sent on for practical experiment. The Russell Process Company at that time advocated the use of rolls, but always recommended a certain make, which were not put in the Santa Rosa mill. Experience has shown that it is better to recommend stamps. The Stetefeldt furnace was not designed by Mr. Stetefeldt for this ore. It was a slight modification on the Lexington mill Stetefeldt, used on a less base ore. The principal change was in the addition of some 10 ft. to the height, dimensions of flues, etc., remaining the same.

Now leaving out all why and wherefore, the crushing department did not deliver to the top of the furnace the ore in any regular way nor in anything like the quantity required. During the time the mill was supposed to be running, 30 weeks, not including total shutdowns for repairs, the time lost in the crushing department by breakage, etc., was 51·3%. The capacity of the furnace was greater than the rolls when both were running, so it was held back as much as possible to let the rolls get a bit of ground ore ahead. But during the 30 weeks' run on the furnace there was a loss of time—no ore falling on account of the crushing machine "break downs"—of 41·6%. If this stoppage had been, say for 10 hours at a stretch, during each day, results would have been better, but this average daily 10 hours' shutdown in many cases would be the total of 20 stoppages, and I think that on an average the furnace was stopped ten times each day for one hour each time.

Now to do good chloridizing under such circumstances, is an impossibility for any furnace, especially so for a Stetefeldt which requires steady feeding and firing for good results. Only once did the furnace get a chance to show what might be expected from it. This time there was a more or less steady run for three days, during which time not a stick of wood was used for heating the ore, and only an ember was kept in the fireboxes. The sulphur contents of the ore roasted it and the chlorinations at this time were above the previous average. While the furnace was well designed for an average ore, such as Ontario or Lexington, for the Sombrerete it was not.

In the first place this heavy ore simply floated off the regular gooseneck screen feeding apparatus. When this was changed, the draught was so small on account of contracted cross-section of return flue and dust

hoppers that the rain of ore almost put the fire out, and the sulphur fumes drove everybody out of the furnace building. For this reason tuyeres were put in the furnace blast, being furnished by a No. 5 Baker and No. 3 Root blowers. While several tuyeres were used two were of prime importance, the first in the shaft opposite the return flue opening to blow the finest ore into the return flue, and the second at the head of this flue to force the fines down the flue and through the dust chambers. With a specially designed Stetefeldt and fine crushing (say 30-40 mesh stamps) no artificial draft would be necessary even on this ore. Salt was at first mixed with the raw ore, but this gave bad results, as it had always done even in the reverberatories. It was then blown in through the lower tuyeres, but, while the chlorinations were fair this way, the mechanical difficulty of introducing the damp salt (for the dry kilns would not dry it), with the blast forced us to abandon this method. Finally the greater percentage was thrown in now and again, the different hoppers by shovel; the decrepitation of the coarse damp salt scattering it sufficiently for chlorination.

Now as to results at starting and during most of the time chlorinations were naturally bad, but to show that Stetefeldt roasting and Russell leaching can handle that ore I may cite the last two runs made. The first was without preliminary heap-roasting, giving 80·3% extraction in sulphides from silver of raw ore with 5·3 oz. of tailings. Thus the final run of 134 tons on heap-roasted ore giving 86·3% extraction with 5·1 oz. tailings. Of course these are the best runs made. The average was far below. But they prove, I think, the process was not at fault.

But at this very point the company required more money. I think any one will admit that with these results a company would be justified in rearranging the mill to allow continual running and no expensive stoppages for repairs. To do so the whole mechanical part of the mill would have had to be remodeled, probably introducing stamps.

With a remodeled mill 85% of the raw ore value could be extracted in sulphides at a cost of not more than $6 (Mexican currency) per ton. But the company at that time was "too weary," so everything was shut down.

Intending at first to solve the problem by pure concentration, the present management have now found what a large percentage of the original value of the ore goes into the by-products, and are now experimenting again on leaching these by-products, in which case the metallurgical routine will be the same as formerly in the old mill, but on a larger scale, with the same metallurgical results.

BAYO MINE, CASAPALCA, Peru, Feb. 10, 1893. FRED. M. WATSON.

COAL, IRON AND STEEL PRODUCTION IN FRANCE.

The production of coal, iron and steel in France for the full year 1892 is given by the Comite des Forges as below, in comparison with that for 1891, the figures for last year, however, being subject to some slight revision from later returns. The statements are, of course, in metric tons, of 2,204 lbs.

The coal production for the year was:

	1891.	1892.
Coal	25,501,595	26,064,073
Lignite	523,298	484,787
Total.	26,024,893	26,548,860

The total increase was 523,967 tons, or 2%. Of last year's production 55% came from the Bassin du Nord, 13% from the Loire and 8% from the Gard.

The production of pig iron and of steel ingots was as follows, in tons, the pig iron being arranged according to fuel used:

Pig iron:	1891.	1892.
Coke	1,867,787	1,997,541
Charcoal	10,385	12,293
Mixed	19,275	12,855
Total	1,897,387	2,022,989
Steel ingots:		
Bessemer	564,066	548,394
Siemens-Martin	276 155	266,583
Total	840,221	814,977

The pig iron production last year showed an increase of 125,602 tons, or 6·6%. The production of charcoal iron is very small and is confined to a few localities; coke iron formed 98·7% of the total output. The production of steel ingots decreased slightly, 25,244 tons, or 3%, although the production of finished steel increased, as shown below.

The production of wrought iron in merchantable forms was as follows, in metric tons:

	1891.	1892.
Puddled	692,979	688,144
Refined with charcoal	8,140	12,561
From old rails and scrap	132,290	127,463
Total	833,409	828,188

The decrease shown last year was 5,241 tons, or 0·6%; this is fully accounted for by the increase in steel. Of the production last year, 706,192 tons were in the form of bars, shapes and merchant iron; 121,558 tons iron plates, nad 418 tons rails. In France, as in this country, the manufacture of iron rails has practically ceased to exist.

The production of steel in finished and merchantable forms was as follows, in tons, divided according to process of manufacture:

	1891.	1892.
Bessemer	388,256	421,503
Siemens-Martin	216,168	198,750
Puddled	16,046	15 958
Cemented	1,455	1,297
Crucible	12,135	10,992
Reheating steel scrap, etc	4,470	6,586
Total	638,530	655,086

The finished products included 231,484 tons of rails; 307,098 tons of bar and other merchant steel, and 116,504 tons of steel plates. The total production showed an increase of 16,556 tons, or 2·6%, the gain being almost entirely in steel rails.

THE NEW MINING LAW OF ECUADOR.

A new law sanctioned in Quito on August 15th last, reforming the mining code of Ecuador, was published in the "Gaceta Oficial," No. 27, August 24th, 1892. The principal alterations, as compared with the previously existing mining law, are as follows: There are added to the list of mines subject to be denounced: Sulphur, chromium, rhodium, iridium, tungsten, petroleum, and coal. Metals and precious stones found isolated on the surface of the soil are to belong to the first finder. The law concedes the perpetual ownership of the mines to private proprietors, on the condition of paying annually a duty for each concession, whether the mine is worked or not, and this ownership shall only be considered lost and forfeited to the State by failure to comply with this condition.

Under Article 8 any person may denounce, and obtain, in accordance with the dispositions of this Code, up to 20 concessions, provided always that they are on vacant ground, or ground not occupied by other miners, and also that they are contiguous to each other, on the course of the same vein, and without leaving intermediate spaces. By another article the annual tax for each concession is fixed at 8 sucres, equivalent to $5, gold. This is to be paid in advance into any of the Treasurer's offices throughout the country. Another article enacts that the mine concession shall only terminate on the failure in payment of the duty for the term fixed by this law, in which case the mine will be put up to auction by the Fiscal Judge. The owner can suspend the sale of his property by payment of double the value of the taxes he owes; but he will not be admitted to make bids or offers on the day of sale, unless he pays a fine equal to the amount he owes and the costs of the sale.

Concessions of regular beds or veins will be of 600 metres horizontal length, by 200 metres breadth. Alluvial claims will comprise a superficies of 50,000 square metres, in the form required by the interested party, the width to be in no case less than 50 metres.

An exemption is granted for 25 years from the date of promulgation of this law, from all fiscal or municipal taxes on the transfer of the proprietorship in mines, and from all fiscal taxes on the mines or their product. For the same period mining properties on not be charged any other contribution than that of the yearly tax before mentioned, nor shall any fiscal or municipal dues be charged for the importation of machinery, tools, utensils, explosives, for the working of the mines, or the treatment of their products. The actual owners of mines can renew title to properties in the form determined by this Code, without prejudice to any rights acquired by other parties. The payments for concessions of mines obtained before the promulgation of this Code are to be in accordance with the measurements stipulated in the present law.

Preventive of Timber Rot.—According to "Le Génie Civil," timber may be rendered impervious to damp and to steam by use of the following composition: Sulphur, 50 parts; resin, 37½; and fish oil, 7½, are melted together in an iron pot; when in complete fusion a little oxide of iron is added. The mixture is applied hot, the first coat being allowed to become dry before the second coat is added.

Canadian Imports of Iron.—The "Canadian Manufacturer" gives the following data concerning Canadian iron imports in 1892: The imports of wrought scrap iron, 36,543 tons, valued at $433,695, or nearly $12 per ton. The duty on this article is $2 per ton, which, added to the value, makes the Canadian cost about $14 per ton. A little over 6,000 tons of this was imported into Nova Scotia, presumably for consumption in the steel works at New Glasgow; and the balance, about 30,500 tons, represents the consumption of scrap iron in Canadian rolling mills, chiefly for making bar iron. The imports of pig iron amounted to 68,918 tons, valued at $886,485, or about $12.80 per ton. The duty is $4 per ton, which, added to the value, made the cost $16.80 per ton. The imports of blooms, muck iron, etc., about 3,100 tons, valued at $56,186, or about $18 per ton. The duty is $9 per ton, which, added to the value, increased the cost to $27 per ton. The imports of bar iron were 7,500 tons, valued at $231,468, or about $31 per ton. The duty on this iron is $13 per ton, which increased the cost to $44 per ton. The mill price for Canadian rolled iron is, about $42 per ton. This iron corresponds somewhat with imported bar iron; and the slightly lower cost of it is sufficient to prevent the importation of any foreign iron except such qualities as are not produced in Canada.

Artificial Diamonds.—Although many chemists, notably Cagniard Latour, Gannal, Despretz, Marsden, and Berthelot have sought to prepare diamonds artificially, its accomplishment has been reserved, says the "Journal des Mines," for M. Henri Moissan. M. Moissan based his process upon certain deductions obtained from a study of the Arizona meteorite which contained a diamond, from a study of the blue diamondiferous earth of the Cape, and of the ashes of diamonds. The process as described by him at a recent meeting of the French Academy of Sciences, was as follows: A cylinder of soft iron was packed tight with sugar carbon; the whole then being placed in a crucible filled with melted iron and heated to a temperature of 3,000 degrees by means of an electric furnace. In such a heat the cylinder fused immediately and dissolved a great quantity of the carbon. As soon as this took place the crucible was taken from the furnace and thrown into water. The rapid cooling causes congelation upon the surface, and when the outside temperature had been lowered to a dull red heat, the crucible was removed and allowed to slowly cool in the air. M. Moissan explains the action which took place as follows: As the temperature of the still liquid mass in the interior is lowered, the iron surrenders up a part of the carbon which it has dissolved, and as the expansion due to cooling is impossible on account of the solidity of the already cold iron cover, an enormous pressure is developed which determines the crystallization of the carbon set free. When the crucible becomes entirely cold, it is broken open and the small crystals are separated from the iron by acids. Sometimes they have the form and appearance of carbonado; sometimes the crystalline form of the diamond, depending upon the time occupied in cooling.

SOFT ORE MINING IN THE LAKE SUPERIOR REGION.*

By Per Larsson, M. E.

"Soft ore" being a relative term, it is necessary to explain that in this paper reference will be had to the brown hematites and limonites of the Marquette Range, locally called "hematites," to the ores occurring east of the Menominee River on the Menominee Range, to all the Gogebic and Mesaba ores, and to the Ely group on the Vermillion Range. The ores occurring west of the Menominee River on the Menominee Range, may be as soft to drill as some of the ores just mentioned, but they are tough and strong, and can be mined by methods prevailing in the hard ore regions.

The methods of mining made use of in the Lake Superior soft ore mines are: 1. Stripping and open pit work; 2. Rooming and timbering; 3. Filling; 4. Caving.

1. Open pit mining has been used more or less on all the Lake Superior Ranges. The stripping has been done by pick and shovel, or by scrapers, and the ore has been hoisted by derricks, or over skip-roads built on the slope of the banks. Since, however, the ore deposits on all the older ranges dip at angles over 45°, almost without exception, the limit of the open pit mining has soon been reached in each case. The discovery of the flat deposits of iron ore near the surface on the Mesaba Range has lately revived the interest in this method of mining, and it will undoubtedly be used there on a much larger scale than on the older ranges. Steam shovels and locomotives are already pressed into service for removing the earth from above the ore beds, and though the strippers have suffered a temporary setback, owing to the difficulties of operating the steam shovels in the frozen banks during the last severe winter, they will eventually prove that the "stripping proposition" is both feasible and economical in the end. The question has been raised as to the amount of surface that can be economically removed. In answer to this, I would state the proposition, as a basis for discussion, that when the volume of ore to be uncovered is equal to, or greater than, the volume of surface to be removed, it will pay to strip.

2. Rooming with Timbering.—This system has been more extensively used than any other in our soft ore mines. The general plan, under this system, is to mine out certain blocks of an ore body on a given level in advance of others, that are left temporarily for the purpose of supporting the rockwalls. The relative sizes of these rooms and pillars vary greatly, but it is quite common to make the rooms from 20 to 24 ft. wide, and the pillars somewhat less. The lengths of rooms and pillars are equal to the width of the ore body. The rooms are worked from the bottom to the top of each lift, and heavy structures of timber are built up in the rooms, as the mining proceeds upward. In some of the larger mines, where this system has been employed, these large underground structures of timber have collapsed under the pressure from the surrounding walls, and in such cases the rooming system has either been abandoned or materially modified. Such extensive caves have, of course, temporarily checked the output of ore, and the system itself has sometimes fallen into disrepute. In cases where the size of the ore deposit is limited, however, this system affords a possibility of a forced output, a fact that commends it to mine owners. The great cost of the heavy timbering, that this method requires, is the chief objection to it. This cost rarely falls below 25 cents per ton of ore.

3. The Filling System.—Rock filling is often used in connection with rooming, in which case lighter timber can be used or timbering entirely dispensed with. Where it is absolutely necessary to keep the surface above a body of soft ore from settling, as, for instance, when that surface is a swamp or a town site, or supports a main line of railroad, no system will answer as well as this combination of rooming and filling. But such cases are not very frequent. The instances in ordinary mining practice when rock filling is most economical and advantageous, are those in which the filling material can be put into the desired place without the use of a shovel, or, in other words, when it is not required to put in the filling close up to the back of a stope. Such a case occurs in the Chapin mine, where, on the lower levels, the ore is of sufficient firmness to stand without timbering in rooms 20 ft. wide and extending the full width of the ore deposit. Here the rooms are carried up by a series of stopes taken 9 ft. high, and after the completion of each stope the room is filled to within 4 ft. of the back, small cars being used to transport the rock filling in the stopes. Other cases in which rock filling is used are those in which narrow deposits of ore are mined longitudinally with stopes reaching from foot to hanging wall. In such cases the rock filling is kept pretty close behind the miners, unless the hanging wall is firmer than we usually find it in soft ore mines. The system of filling introduced eight years ago into the Chapin mine, whereby the whole ore body in each lift was mined by slicing the ore out floor after floor from the bottom up, and replacing each slice with rock filling close to the back, has been abandoned, on account of the great expense of shoveling the filling into the stopes, and the high cost of the necessary openings.

4. Caving.—Two distinctly different applications of the caving methods are now used on Lake Superior. In the one, the miners commence stoping at the top of a lift, and are always working under a "gob" roof, while in the other they attack the ore at the bottom of a lift, and work under a crumbling block of ore, which keeps sinking down to them. The former method has long been employed in European soft ore mines, especially in the North of England, and it has been in use for a number of years in this region; while the latter is a new method, adapted on a large scale a year and a half ago in the Chapin mine. The former is well adapted to such soft ground as permits the mining of the ore chiefly with pick and shovel, while the latter can be used in quite firm ground, which breaks up more or less in settling, before it reaches the miners, the bottom floor alone being in its natural solid state when mined.

The North of England system has the advantage that it can be used in irregular ore bodies, without danger of leaving behind offshoots from the main ore body. When it is desired to use the Chapin system in relatively flat or irregular ore bodies, it becomes necessary to make the lifts short. In such cases it may be found advantageous to use a modification of the North of England system, such as is now successfully employed in the Chandler mine, where each lift is mined from the top down, but each floor is taken 15 ft. thick. Other applications of the caving system may be seen in the Norrie and Lake Angeline mines, where on the chamber and pillar plan the ore is mined in vertical sections from the hanging to the footwall, and the hanging rock or overlying "gob" is caused to run into these sections as they proceed toward the footwall.

In conclusion, it may be said that the conditions met with in the different mines are so varied that no two mines can be worked by exactly the same plan. Those who have had pet methods, are fast giving them up. Those who have advocated filling may occasionally find it to their interest to cave, and those who are professional cavers are sometimes found to be engaged in rooming. And all of us would perhaps be only too glad to join our Mesaba friends in adopting their "stripping proposition," if nature had not turned our deposits edgeways in the ground.

We must, however, adapt ourselves to the conditions that meet us, and by learning from each other's experience endeavor to keep ourselves to the front among American miners.

The reading of this paper was followed by a discussion, in which Mr. Channing argued at some length that the drawing of the ground would carry with it the adjoining walls with its enclosed ore feeder; but it would appear that although there was more or less caving there was no good reason advanced why an upraise could not be put through the broken ground of the ore-feeder, and it be worked down from the top as was done with the main lens. Mention also was made of the modification of this system as practised at the Chandler mine, and described and illustrated by Mr. D. H. Bacon in the "Transactions of the American Institute of Mining Engineers," Vol. XXI. 1892. In the case of the third system, which has now been in use for a year and a half at the Chapin mine, there are some novel features introduced. It consists in undercutting a pillar of ore, and allowing the mass of ore to crush and gradually fall, to a solid floor; when a second cut of the general dimensions of a wide drift is made across the ore body from foot to hanging wall and for the length of the pillar; the crushing down, by its own weight, of the ore, breaks it up and in a measure facilitates the mining.

* Paper read at the first meeting of the Lake Superior Mining Institute.

The Westphalian Coke Syndicate.—The Ruhr coal combine has begun operations with the chances in favor of its stability. In 1892 the Westphalian coal syndicate was fairly prosperous. In the upper mining district of Dortmund the production of coke was 4,560,984 metric tons, as against 4,388,010 tons in 1891. Of the output in 1892 the syndicate had 4,025,053 tons, the independent operators 142,350 tons, and the coke ovens controlled by the iron works 393,581 tons. The syndicate controlled 6,304 ovens at the close of 1892. The price of coke at Dusseldorf was as follows on March 9th, 1893: Cupola, $3.37 to $3.62; blast furnace, $2.75; crushed, $2.25 to $2.75. The attempt of the syndicate to control the output, and consequently the price of coke, is being watched with a great deal of interest, but it is not likely that the German government will allow the combine to become oppressive.

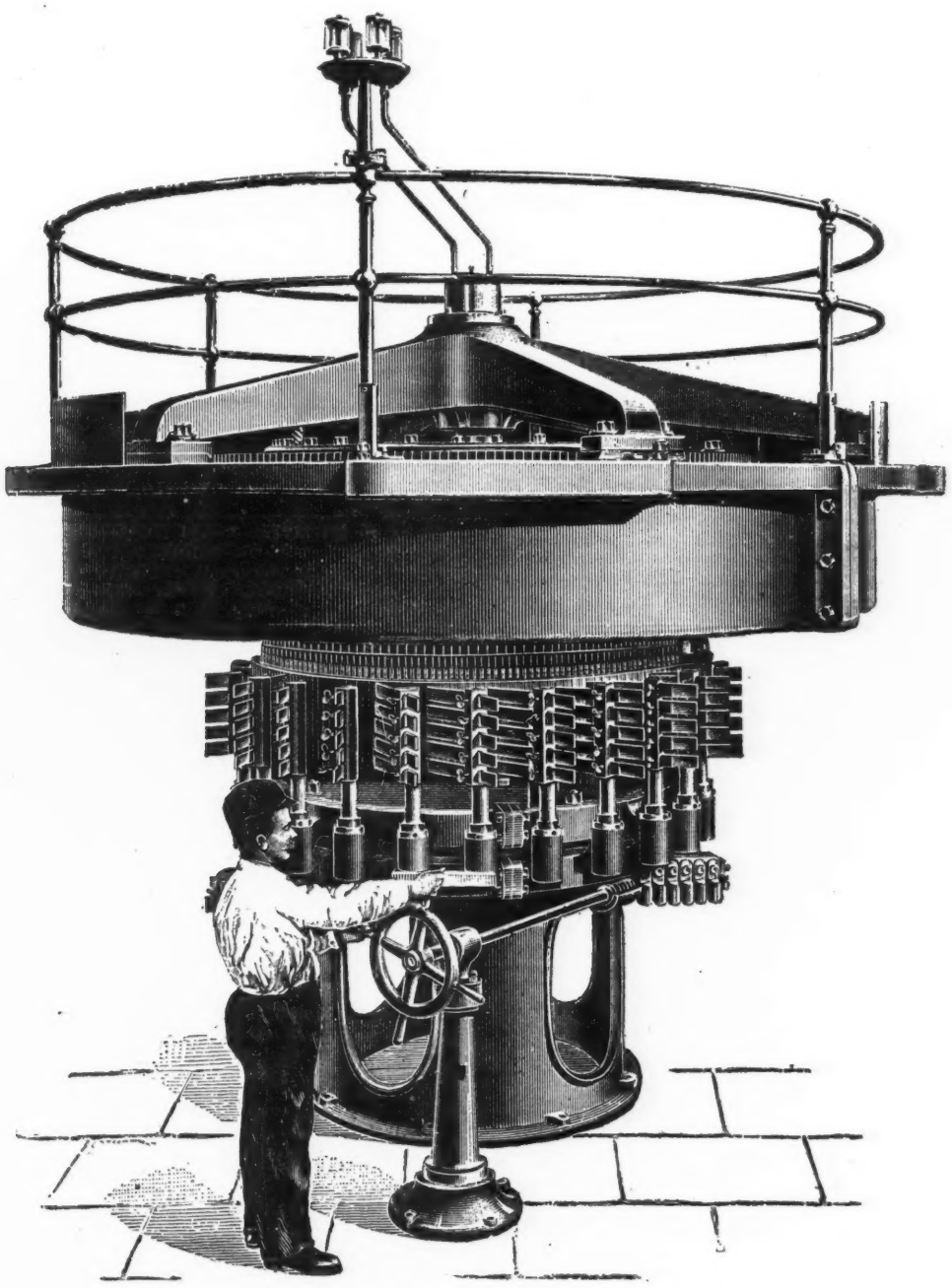
Oil Engines for Street Cars.—An application of the gas or oil engine to the propulsion of street cars is to be found in Chicago, where the Yerkes syndicate are experimenting on a practical scale with the Connelly motor. We are now informed that an oil engine company at Dessau, Germany, is offering to equip a line of street cars at Erfurt in the same empire. At that city the horse cars are to be given up, and it was intended to ask the Thomson-Houston Company to erect an overhead electric line until the oil engine proposition was brought forward. It is very doubtful whether a system of cars driven by oil engines can ever be worked as cheaply as the overhead electric system, on account of the weight of the engine and tank of oil that necessarily forms part of the load of each car. At the present time a commission is investigating the relative merits of the overhead electric and oil engine systems as applicable to the Erfurt street lines.

The Connelly motor was tried for a time in Elizabeth, N. J., with very unsatisfactory results. It is said, however, that improvements have been made in the motor since then.

Silicon in Oblique Octahedral Crystals.—Mr. H. N. Warren, of Liverpool, England, has lately obtained pure silicon in the form of large oblique octahedra, and he describes the process of production of this new form of the element in the "Chemical News." This discovery would appear to be an important one, for never before has this form of the element been obtained nor has it been obtained in any form in such large quantities, so easily, and in such purity. The crystals so produced are as perfect as those of alum, and are often 1½ in. in length and thickness. Their appearance resembles that of cast iron crystals which are sometimes met with on breaking a pig of cast iron. They are insoluble in all acids except hydrofluoric acid, and on analysis show no trace of admixture or impurity. In producing these crystals, pieces of metallic aluminum about the size of a walnut are introduced into a clay crucible containing a fused mixture of four parts of potassium silicofluoride, one part of potassium chloride and two parts of potassium carbonate. After the violent reaction attending the introduction of the aluminum has subsided the crucible is heated to whiteness for about five minutes. After cooling and breaking the crucible and contents a perfect round button containing 80% silicon is obtained. This button is freed from any clinging slag and placed in a plumbago crucible in contact with about 12 times as much aluminum as the button itself contains, together with two parts by weight of metallic tin, and the whole covered with a layer of sodium silicate. The crucible and contents are then subjected to the most powerful heat available for about two hours. After cooling and breaking the piece of aluminum around it, the silicon is found in the form of perfect, large crystals possessing a full metallic lustre and true models of oblique octahedra.

A VERTICAL DYNAMO FOR ELECTRO-METALLURGICAL PURPOSES.*

The engraving given shows a vertical dynamo, a somewhat unusual form, made for the Aluminum Industrie Actien-gesellschaft at Neuhausen, Switzerland, by the Maschinenfabrik Oerlikon. The dynamo has an output of 400 kilowatts, and is coupled directly to the vertical shaft of the turbine. The star-like bracket on top of the magnet frame carries the top bearing of the dynamo shaft; the magnet has 24 radial inward pole-pieces, the whole being of cast iron and supported by heavy iron frames, not shown in the engraving. The dynamo shaft carries the armature and the commutator, a total weight of revolving material of about 12 tons. The brushes, 120 in number, can be moved within certain limits by means of a hand-wheel. The magnetic proportions are such that there is but very little shifting of the brushes at varying loads. The machines are shunt-wound and self-exciting.



DYNAMO AT THE NEUHAUSEN ALUMINUM WORKS, SWITZERLAND.

The plant at the works of the Aluminum Industrie Actien-gesellschaft comprises one of the finest electrical installations in existence, which utilizes the power generated by the falls of the Rhine. Up to the present, dynamos of a total of 2,000 H. P. have been in operation. The additions to this plant, comprising four generators similar to that illustrated, and designed to give 7,500 amperes at 55 volts, and to run at 150 revolutions per minute, will give an aggregate capacity to the whole plant of 3,900 H. P.

The turbines for driving the dynamos have been constructed by Messrs. Escher, Wyss & Co., Zurich, and are provided with a device for hydraulically counterbalancing the weight of the moving parts, thus minimizing the pressure on the bottom bearing.

* From the London "Industries."

ABSTRACTS OF OFFICIAL REPORTS.

ATLANTIC MINING COMPANY, MICHIGAN.

This company has still further reduced its cost of treatment, the directors report for 1892 stating that "although the yield of the rock stamped shows no improvement over that of 1891, yet the results of the year's business may be considered favorable, as the costs per ton of rock handled have been lower than in any previous year, and a fair profit has been realized. Owing, however, to the expenses connected with the construction of bulkheads along the harbor lines of Portage Lake and the contemplated removal of the mill to the Lake Superior shore, which includes the construction of new buildings and of a railroad nine miles long, of which the estimated cost is about $200,000, it was decided that it would not be wise to diminish the cash resources of the company by the payment of a dividend. During the year the total receipts were as follows: 3,703,875 lbs. of copper, $440,653; interest, $3,471; stumpage, $280; total, $444,404. The expenses were: Working expenses, $391,369; construction, $10,354; total, $401,723. The net profit was $42,681. The surplus January 1st, 1892, was $252,834, and on January 1st, 1893, it was $295,515.

The assets and liabilities January 1st, 1893, were as follows: Assets, cash, $33,236; copper bills, $24,346; loans, $100,000; copper on hand (since sold), $85,891; accounts receivable, $2,476. At the mine there was cash and various supplies amounting to $87,941; making a total of $333,892. The liabilities included: Indebtedness at mine, $24,132; agent's drafts outstanding, $5,833; accounts payable, $8,411; total, $38,376; leaving the balance of assets, $295,516.

The total receipts and disbursements since the organization of the company have been as follows: Receipts, capital stock, $700,000; assessments, $280,000; sales of copper, $8,143,906; other sources, $853; total,

ATLANTIC MINE.

YEAR.	Capital Paid in.	Stamped.	Copper Produced.	Yield, per cent.	Selling Price per Lb.	Total Receipts.	cost. Mining per Ton.	Hauling to Mill.	Surface Exs.	Stamping per Ton.	Smelt'g per Lb.	Brok'ge per Lb.	Imprt. per Ton.	Total per Lb. Copper.	Total per Ton Milled.	Net Profit. Per lb. Copper.	Per Ton Milled.	Dividends.	Stoping, per Fathom.	Drifting per Ft.	Sinking per Ft.
	$	Tons	Lbs.	%	Cts.	$	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	$	Cts.	Cts.	$	$	$	
1890	981,000	278,300	3,619,972	.65	14.9	545,521	79	3.4	24	28	1.2	.3	11	11.8	1.55	3.1	40	40,000	4 21	5.19	22.90
1891	981,000	297,030	3,653,671	.62	12.6	461,649	76	3.9	19	26	1.2	.3	11	11.8	1.55	0.7	12	.....	4.33	4.52	16.05
1892	981,000	300,900	3,703,879	0 615	11.89	444,404	65	3.3	16	25	.9	.5	3.4	10.85	1.30	1.0	14	.....	3.98	4.72	16.29

OSCEOLA MINE.

1890	1,250,000	183,875	5,294,792	1 4	15.6	$828,994	144	28.9	12	33	2	0.1	41	11.2	3.23	4.4	127	225,000	11.75	7.11	15.33
1891	1,250,000	234,325	6,547,358	1 4	12.5	839,751	143	15.5	14	36	2.1	0.1	24	10.1	2.82	2.4	67	150,000	10.96	6.32	16.05
1892	1,250,000	247,575	7,098,656	1.43	11.68	835,471	135	15.4	19	38	1.54		10.8	9.1	2.62	2.6	76	150,000	11.09	5.87	18.88

$9,124,759. The expenditures have been: Real estate, $705,994; equipment, mining, smelting, taxes, etc., $7,423,249; dividends, $700,000; total, $8,829,243; net surplus, January 1st, 1893, $295,516.

The expenses during 1892 were as follows:

Mining.	Per ton Stamped	Per lb. Copper.
Sinking 113 feet @ 16 29 net	$0.0061	.....
Drafting 4,250 feet @ 4 72 net	0.0662	.....
Stoping 16,121 fathoms @ 3 98 net	0.2133	.....
Timbering, tram mining and labor	0.2420	.....
Supplies, timber, etc	0.0419	.....
Pumping and operating air compressors	0.0759	.....
Total mining	$0.6454	$0.0527
Surface expenses	$0.1572	$0.0155
Transportation	0.0333	0.0027
Stamping, etc	0.2510	0.0203
Smelting	0.1115	0.0091
Freight, brokerage, etc	0.0650	0.0053
Construction	0.0340	0.0028
Totals	$1.2974	$0.1084

Mr. F. McM. Stanton, the agent, reports the work done during the year as follows: Cubic fathoms broken, 17,811; cubic fathoms stoped, 16,932; rock stamped, 300,900 tons; product in mineral, 5,028,560 lbs.; product of refined copper, 3,703,875 lbs.; yield of refined copper per cubic fathom broken, 207·9; yield of refined copper per ton of rock treated, 12·31 lbs., or 0·615%.

The 8th level north of No. 1 shaft has not reached the limit of the property, but the poverty of the vein and a poor hanging wall made it advisable to abandon it. No. 1 shaft has been continued to the 11th level, and ore is being hoisted from this point. The 15th level north of No. 2 shaft has been reopened, and regular drifting and stoping continued there. It is now just north of the transverse, and is getting into better ground. No. 2 shaft is down to the 16th level, and hoisting is being done from that point. The 21st level in No. 3 shaft has been opened, both north and south, and drifting and stoping continued there. No. 3 shaft is sunk to the 22d level, and opening both north and south has just begun. In the 20th level south of No. 3 an upraise is being made to connect with No. 4 shaft, which is now in operation to the 19th level. The 15th and 16th levels south have been abandoned as they are poor, and so long that the tramming has become expensive. There have been no decided changes in the mine since the last report, but the vein at the bottom of No. 3 shaft is of good width and better than that at the 20th and 21st levels.

During September the mine was closed for a week, owing to labor troubles, and during this time repairs were made to the rock house and machinery, compressors, railroad and stamp mill. The establishment of harbor lines in Portage Lake has necessitated the erection of bulkheads, 2,000 ft. in length, and a new dock for the reception of coal and freight. The cost of these amounted to about one-half of the total construction account. During the coming year it will be necessary to construct several hundred feet more of these bulkheads, in order to comply with the law regarding the deposits of stamp sand into the lake. Although the quantity of ground broken during the past year is less than that of the previous year, yet the surplus of rock on hand underground is slightly increased, so that now the supply is larger than ever before. This causes an appreciable saving in the cost of tramming.

OSCEOLA MINING COMPANY, MICHIGAN.

The output of this company during the year ended December 31st, 1892, was the largest in its history, amounting to 7,098,656 lbs. of refined copper for which it received $828,916; an average of 11·68 cents per pound. Other receipts were: Interest, $3,938; sale of lots, $2,461; and sales of silver, $155; total, $835,471. The expenses were: At the mine, $511,413; smelting, transportation and all other expenses of selling copper, $109,016; construction, $26,812; total, $647,242. The balance or net income was $188,229. The dividends paid, Nos. 33, 34 and 35, amounted to $150,000; leaving a surplus of $38,229. The balance of assets on January 1st, 1892, was $226,507; on January 1st, 1893, it was $264,736.

The assets and liabilities on January 1st, 1893, were as follows: Assets, cash in bank and accounts receivable at Boston and copper on hand, $252,367; cash and accounts receivable at mine, $14,695; supplies at mine, $35,033; fuel on hand, $31,574; 250 shares Hancock & Calumet Railroad Company, $25,000; total, $358,669. Liabilities: Accounts payable, $92,830; dividends uncalled for, $1,102; total, $93,932; balance of assets, $264,736. The total receipts from September, 1873, to January 1st, 1893, were as follows: Capital stock, $1,250,000; sales of copper, 69,569,003 lbs., $10,313,656, an average of 14·82 cents per lb.; sales of silver, $35,910; interest, $41,628; 610 shares Hancock & Calumet Railroad Company, $61,000; total, $11,702,184. The total expenses during the same period were: Running expenses, $8,167,760; construction, $926,785; real estate, $579,935; exploratory expenses, $15,467; dividends paid, $1,747,500; total, $11,437,447; balance of receipts, $264,736.

The operations during 1892 were as follows: Rock hoisted, 277,758 tons, equal to 15,431 cubic fathoms of ground broken; rock stamped, 247,575 tons; product of mineral, 8,260,392 lbs.; refined copper, 7,098,656 lbs. The yield of refined copper per ton hoisted was 25·5 lbs, or 1·275%; per ton stamped, 28·67 lbs., or 1·433%. The expenses were divided as follows:

Mining 277,758 tons:	Per ton.	Per lb. copper.
Shaft sinking, 460 7 ft. @ $18.88	$0·031	.....
Winzes, 2,136·3 ft. @ $5.82	0·044	.....
Drifts, 6,914 9 ft. @ $5.84	0·146	.....
Stoping, 14,581·8 fathoms @ $11.09	0·582	.....
Tramming	0·193	.....
Supplies	0·084	.....
Superintendence and construction account labor	0·082	.....
Extra work and blacksmith, carpenter, etc	0·038	.....
Total	$1.199	$0·171
Milling 247,575 tons:		
Transportation (mine to mill)	0·154	.....
Stamping	0·78	.....
Rock house (breaking)	0·106	.....
Supplies and general	0·084	.....
Total	$0·722	$0·0249
Smelting, transportation, etc	0·440	0·0154
Construction	0·109	0·0038
Totals	$1.271	$0·0141

The superintendent, Mr. John Daniell, in his report says that it is satisfactory to note an improvement in the yield of copper per ton of rock handled, as well as a reduction in the cost of treatment. With the increasing output from the south end of the mine the cost is not expected to increase. Mine openings for the year were 6,160·4 ft. Sinking and drifting for pillars for the year amounted to 3,351·5 ft. No sinking was done for the year except in shafts Nos. 4 and 5. The shafts are now down to the following depths: Shaft, No. 1, 1,387·1 ft.; No. 2, 2,072·7 ft.; No. 3, 2,663·3 ft.; No. 4, 2,204·2 ft.; No. 5, 2,239·9 ft.

Sinking No. 3 shaft under 28th level was resumed in January, 1893. It is now down about 55 ft., but 4 ft. of the lode is carried in the shaft, and that part of it is fairly good for copper. The 25th, 26th, 27th, and 28th levels, both north and south of No. 3, have been drifted in all 1,581·2 ft. Nearly all the ground opened will be stoped, some of it being very good. Rises above 26th and 27th level in line of No. 4 shaft have been put in. No. 4 shaft has been sunk 89·2 ft.; the lode good for copper. South of No. 4 shaft the 18th, 19th, 20th, 22d, 24th, and 25th levels have been extended in all 1,073 ft. Excepting some short bars, all the ground opened here is of average quality. No. 5 shaft has been sunk 371·5 ft. It is now down to 25th level. Lode here has maintained its productiveness and is of good character. The 19th level south has been pushed beyond the line of what seemed, last year, the limit of copper ground; it has passed through a poor bar, and opened about 50 ft. of good stoping ground. The advance breast just now shows considerable heavy copper, and is much better than the average ground. A continuance of this will assure a further extension of the mine south, and probably call for the sinking of No. 6 shaft in due time. During the year the mill stamped 30,800 tons for the Kearsarge and Tamarack, Jr., mines.

The accompanying table shows the cost of mining, stamping and smelting at the Atlantic and Osceola mines for the years 1890, 1891 and 1892. The figures given for 1890 and 1891 are taken from "The Mineral Industry," which contains tables giving the cost of working at these and other mines since their opening; this work should be consulted by all interested in the subject.

ALLOUEZ MINING COMPANY, MICHIGAN.

In the report for 1891 the directors recommended that operations be suspended as soon as it could be done with advantage with reference to working up the stock of ore on hand. This policy was adopted and production ceased on April 15th. On this point Mr. Stanton says "The Allouez lode is large and persistent, but varies considerably in its copper contents and has never yielded a sufficient quantity of copper to be worked profitably with copper below 12½ cents per lb." Explorations with the diamond drill were made on the Calumet & Hecla lode, but they failed to reveal anything of value. Near the close of the year explorations were made on the Quincy and Osceola lodes, and although no decisive results were obtained it is recommended to continue them during the present year. The mine is kept free from water and operations can be resumed whenever it is thought advisable.

The receipts and expenses during the year were as follows: Receipts, 546,530 lbs. of copper at 11·45 cents, $62,599; sales of pine timber, $3,000; total, $65,599; expenses at mine, $70,154; smelting, transportation, brokerage, $11,203; total, $81,357; excess of expenditures, $15,758; balance of assets, January 1st, 1892, $22,185; January 1st, 1893, $6,427.

The present condition of the company is shown by the following condensed balance sheet. Assets: Cash, $4,558; capital stock owned by company, 720 shares, $567; supplies at mine, $3,679; total, $8,804. Liabilities: Agent's drafts, $1,000; indebtedness at mine, $886; account payable, $491; total, $2,377; balance of assets, $6,427.

The report does not give the quantity of tons hoisted, and consequently we cannot give our usual abstract of costs. The superintendent in speaking of the exploratory work done during the year says: A drill hole was run through the Osceola amygdaloid at a depth of 420 ft.; lode was fully 25 ft. wide, but quite barren, except near the footwall, where it showed a little fine copper. The agent advises that a number of other holes be driven near the above. The supposed extension of the Pewabic lode was explored by some open cuts, in two of which the amygdaloid was found to be well defined and showing a little copper in bunches.

CENTRAL MINING COMPANY, MICHIGAN.

This company made a profit during 1892 of $10,280, but no dividend was paid. The output of the mine was somewhat larger than that of the previous year, while the expenses were somewhat less.

The receipts and expenditures during the year were as follows: Receipts, from 1,625,82 lbs. copper at 11·95 cents, $194,346; add interest received, $1,311; total, $195,657. Expenditures: Working expenses at mine, $156,760; smelting, freight, and all other expenses, $28,617; total, $185,377; balance, $10,280; the surplus from 1891 was $159,701; add amount credited real estate for stumpage, $4,056; making the net surplus, December 31st, 1892, $174,037.

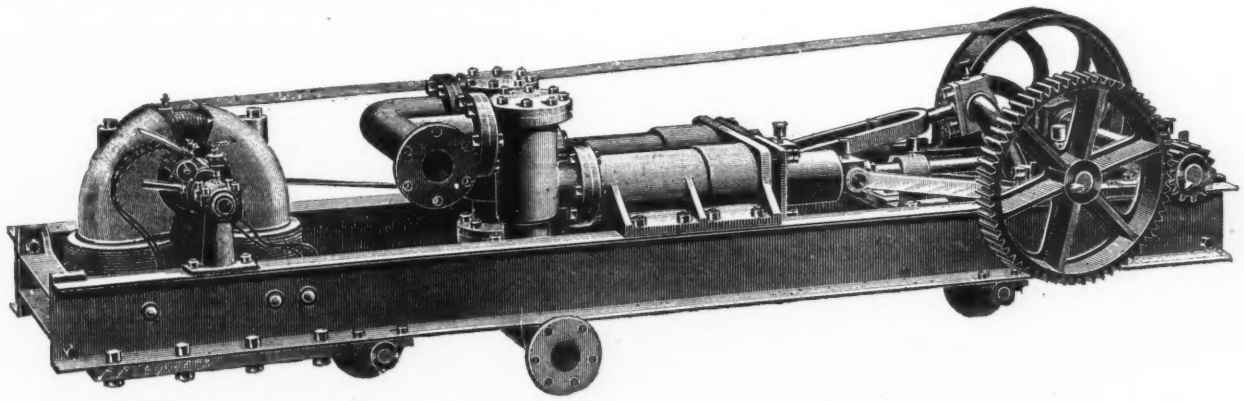
The assets and liabilities on January 1st, 1893, were as follows: Assets: Cash, $40,752; loans, $20,500; copper on hand, $69,003; accounts receivable, $949; cash at mine, $2,537; supplies, $66,107; a total of $199,849. The liabilities were: Agent's drafts, $928; indebtedness at mine, $18,727; accounts payable, $6,157; leaving the balance of assets, $174,037.

The expenses during 1892 were as follows: Mining and surface expenses, $142,488, or 8·76 cents per lb. of copper; stamp mill expenses, $15,768, or ·98 cent per lb of copper; smelting, freight and commissions, $28,617, or 1·76 cents per lb. of copper; taxes, $2,845, or ·17 cent per lb. copper; total, per lb., 11·67 cents, from which deduct ·27 cent received for rents, leaving a balance of 11·40 cents. Details of mining

Mining:	Per ton stamped.	Per lb. copper.
Winzes, 720·5 ft. at $8.12	$0·095	.....
Drifts, 2,990 ft. at $6 77	0·331	.....
Stoping, 4,047 fathoms at $9.57	0·634	.....
Tramming	0·174	.....
Timbering and supplies	0·074	.....
Superintendence and labor	0·140	.....
Supplies	0·023	.....
Totals	$1 471	$0.0617
Transportation	$0·206	$0·0087
Breaking	0·073	0·0031
Stamping	0·433	0·0181
Surface and labor	0·091	0·0032
Smelting, brokerage and freight	0·470	0·0195
Construction	0·185	0·0079
Totals	$2·929	$0·1222

The superintendent, Mr. John Daniell, reports operations during the year as follows: Rock hoisted, 79,942 tons, equal to 4,441 cubic fathoms of ground broken; rock stamped, 60,986 tons; product of mineral, 1,747,636 lbs.; product of refined copper, 1,467,758 lbs.; yield of refined copper per ton stamped, 24·07 lbs., or 1·2%; yield of refined copper per cubic fathom of ground broken, 394 lbs.

No sinking was done in the shaft during the year, particular attention being paid to the extension of the lower levels south with the hope of encountering a new ore body. The extension of the 2d level north of No. 2 shaft has been entirely in stoping ground of good quality. The lode in the 3d level, north, shows copper for all the distance driven and at points was fairly good. The 4th level afforded nothing of importance, but it is proposed to test the ground during the present year.



ELECTRIC PUMPING PLANT, NEWTON COLLIERY, ENGLAND.

are given as follows: Sinking winzes, 149·5 ft., average cost, $12.08; drifting 2,614·9 ft., average cost $7.83; stoping on vein, 2,368·8 fathoms, average cost, $13.57. The average yield per fathom of ground broken was 494 fathoms.

Mr. James Dunstan, the agent, reports operations during the year as follows: No. 2 shaft has not been sunk below the 32d level the past year. The 32d level south of No. 2 shaft was extended 102 ft., and north of the shaft 301 ft. on the west vein to intersect the belt of conglomerate. These drifts have shown no copper worth mentioning and have been discontinued. The 31st level north of the conglomerate has been extended 346½ ft. on the main lode, mostly through poor ground. The 30th level north has been extended 275 ft. through good paying ground the entire distance. At present the vein is large, but split with horses of trap rock running through it. The 29th level has been extended north 236 ft. and throughout the entire distance the vein has been very good, varying from 2 to 8 ft. in thickness, and still showing a fair vein of 3 ft. in width. Stoping has been done upon the vein in line with the conglomerate in the back of the 28th level and it is producing copper in paying quantities, but it is not what might be called rich, and at this point the conglomerate has completely wedged out and a soft belt of amygdaloid has taken its place. All of the paying copper ground at present is north of the conglomerate and is working up beyond any of the upper workings and should this continue up, with the bottom of the north ground showing as well as at present, the prospects for this year will be much better than the one just ended.

KEARSARGE MINING COMPANY, MICHIGAN.

This company made a mining profit during the year 1892 of $1,454, but owing to the destruction by fire on June 15th of the rock house, which was rebuilt at a cost of $11,340, the company was obliged to appropriate $9,886 from the balance brought forward January 1st, 1892.

The receipts and expenditures during the year were as follows: Receipts, from 1,467,758 lbs. of refined copper, $168,123; sales of silver, $750; interest, $685; total, $169,559. Expenses: Mining and development, $139,416; smelting, transportation, etc., $28,689; construction, $11,340; total, $179,445; net loss, $9,886. Balance of assets, January 1st, 1892, $163,778; January 1st, 1893, $153,891. The assets and liabilities on January 1st, 1893, were as follows: Assets, cash in bank, accounts receivable at Boston and copper on hand (since sold), $146,901; cash at mine, $1,159; supplies, $5,802; 250 shares Hancock & Calumet Railroad Company, $25,000; total, $178,862; liabilities, drafts and accounts payable, $24,971; balance of assets, $153,891. The total receipts and expenditures since the organization of the company have been as follows: Capital stock, $650,000; sales of copper (7,562,944 lbs. at 13·29 cents), $1,005,391; interest, $10,302; sales of silver, $2,133; total, $1,667,826; expenditures, balance of total expenses prior to 1886, $29,206; running expenses, $844,539; construction, $85,125; real estate, $474,000; exploratory, $1,064; dividend No. 1, $80,000; total, $1,513,935; balance, $153,891. The expenses during 1892 were as follows:

In the 15th level, south of No. 2 shaft, several stretches of good stoping ground were encountered; it was, however, bunchy. On the 9th level south nothing of importance was found after running some 246 ft. On the whole, efforts were made particularly on the south part of the mine, but it is now proposed to test the lode in the direction of the lower north openings.

AN ELECTRIC PUMPING PLANT.

The illustration which is given herewith shows an electric pumping plant recently built by Ernest, Scott & Mountain, of Newcastle-on-Tyne, England, for the Newton Colliery in Northumberland, which is described in a recent number of London "Engineering." It was designed to meet the special requirements of colliery pumping, more especially in cases in which it is necessary to move the pump about. The complete plant consists of a steam engine and electric generator, and of a set of horizontal pumps and motor. The steam engine is of 10 H. P., and is fixed at bank, where it drives a Tyne compound-wound dynamo constructed to give an output of 30 amperes at an electromotive force of 200 volts when running at a speed of 1,100 revolutions per minute.

The dynamo used is of the two-pole type, and the current from it is taken to a switchboard fitted with quick-break double-pole switches mounted on an enameled slate base, on which also are fitted a voltmeter and ampere-meter for measuring the current and pressure.

The current from the switchboard is taken down the shaft by a pair of 7-16-in. vulcanized cables. The pumps are of the two-throw type, the rams being 6 in. in diameter by 10-in. stroke. As will be seen from the engraving the pumps are mounted upon two channel-iron girders, which are firmly bolted to distance pieces, the center distance piece carrying the guides for the tail rods. The crankshaft and countershaft are mounted at one end of the girders, and upon the former is keyed a spurwheel driven by a pinion on the countershaft. The motor is placed behind the pumps, and is completely encased by a strong brass cover, not shown in the engraving, intended to prevent dust and dirt getting to the working parts.

The power from the motor is transmitted to the pumps by an endless cotton belt specially made to resist the wet. The whole framing of the pumps and motor is mounted on wheels, enabling it to run along the tram rails in the pit.

THE DEVELOPMENT OF SOME ONTARIO ORES.

Written for the Engineering and Mining Journal by T. D. Ledyard.

While there has not been much development of the iron ores of central Ontario during the last two years, sufficient has been done to show that some of them are remarkably free from phosphorus.

The Belmont iron mine, on Lot 19, in First Concession of Belmont township, 110 miles east of Toronto, has been further developed by diamond drill holes and shafts. The removal of a few feet of soil over a considerabe space has uncovered a large body of high grade magnetic ore, the average of the first thirteen analyses made by the Belmont Bessemer Ore Company, the lessees of the mine, being as follows: Metallic ore, 66·23; phosphorus, ·013; sulphur, ·016; silica, 3·88.

The average of a number of analyses made by William Molin, E. M., is given by that gentleman as follows: Metallic iron, 65·10; phosphorus, ·005; sulphur, ·07; titanic acid, ·04; silica, 3·83.

The Pennsylvania Steel Company made an analysis from a number of samples sent them, which showed: Metallic iron, 68·930; phosphorus, ·007.

The lessees are constructing the Ontario, Belmont & Northern Railway from the mine through Marmora township and village to connect with the Central Ontario Railway and the Canadian Pacific Railway, about ten miles from the mine, and have the mining plant ready for working on an extensive scale as soon as the railway is completed.

In the summer of 1891 a discovery of gold was made in a quartz vein on Lot 20, First Concession of Belmont, the next lot to the iron mine on the north. A shaft 10×10 has been sunk here to the depth of 120 ft. Small quantities of pyrites were found near the surface, and as the shaft descended they increased; at the bottom of the shaft nearly half the vein matter is pyrites. Some of the ore in which there was no visible gold assayed $50 and upward to the ton.

Mr. Middleton Crawford, the inventor of the Crawford mill, is working this mine with about 30 ment; he has on the ground 2 Crawford mills, a Gates ore crusher, steam hoist, 65 H. P. boiler, 30 H. P. engin, steam pump and suitable buildings. Mr. Crawford intends to treat 30 tons a day, as soon as he gets another mill at work. The hanging wall of the vein is granite, and the foot wall, slate the vein, although broken at the surface, is well defined as it descends, and is 2½ ft. wide at the bottom with indications of widening. Five other veins, all showing gold, have been found upon the property.

In the township of Snowdon, 110 miles northeast of Toronto, where there are also deposits of magnetite particularly low in phosphorus, some further developments have been effected.

Prof. C. Gordon Richardson, of Toronto, in his report on Lots 25, 26 and 27 in the Fourth Concession of Snowdon, says: "The country rock consists essentially of micaceous and hornblendic gneiss, dolomite and crystalline limestone with a massive dyke of diorite crossing from southwest to northeast, conforming in this respect to the general strike of the limestones and gneiss. These rocks form a bold, precipitous bluff about 150 ft. in height, at the foot of which the Irondale Railway and old Monck road pass together with the Burnt River, a tributary of the Gull waters."

Deposits of magnetite occur in the diorite outcropping in more than a dozen places at intervals for nearly a mile, showing ore masses from 10 to 50 ft. in width, in one place a strong needle attraction being shown over a space more than 200 ft. square. On these outcrops several pits have been sunk 10 to 15 ft. deep, with good results—with a shaft in the center lot 85 ft. deep.

The average of four analyses of these ores gives: Metallic iron, 62·26; phosphorus, ·009; sulphur, ·052; and no titanium.

The ore is finely granular and not too dense in texture. The general trend of these deposits is northeast and southwest.

About a mile and a half to the east other outcrops of magnetite occur near the south shore of Devil's Lake. These are situated at or about the summit of the range of hills which rise abruptly from the lake trending southwest and northeast, the general elevation being about 150 ft.

The ore here is of excellent quality; one of the deposits measures 130 ft. east and west, and nearly as much north and south. An analysis made by William Molin shows: Metallic iron, 69·246; phosphorus, ·012; sulphur, ·038; titanic acid, traces only.

The strong point in favor of these ores is their freedom from phosphorus, which will be better understood by a comparison in that respect with Lake Superior ores.

The weak point about these Ontario ores is that they are situated in Canada, where there is no local market, and although they are much nearer to many furnaces in the United States than Lake Superior ores, the United States duty of 75c. per ton is a serious drawback.

There is not a single blast furnace either of charcoal or coke in the Province of Ontario, although it contains over 2,000,000 inhabitants, and the ores we have been noticing are little more than 100 miles from Toronto, a city of nearly 200,000, where there are facilities for iron smelting, and which is a good distributing point.

A Fountain Drawing Pen.—A useful reservoir drawing pen is being made by Jackson Brothers, of Call Lane, Leeds, England. It consists of an ordinary hinged nib drawing pen whose handle is hollow and is made so as to contain a cylinder. A plunger is used for filling this cylinder, and a tube passes down to the space between the blades of the pen. To fill the cylinder it is unscrewed from the handle and the end of the tube is placed beneath the surface of the liquid ink and the plunger drawn out. The whole is then replaced without, of course, moving the plunger. A slight pressure at the end of the plunger will supply sufficient ink to the nibs. Everyone who uses a drawing or ruling pen will appreciate this form of the instrument. The only wonder is that such a thing has never been made before. In form it is a simple application to the drawing pen of the principle of the best fountain pens used for writing.

MAGNETISM IN THE TRANSMISSION OF POWER.

The application of magnetism to mechanical purposes has been referred to in our columns, and a new method of utilizing magnetic force has recently been patented by Mr. Thomas A. Edison. The drawings given show one form of the application, as set forth in his patent specifications. The object of this invention is to produce a new mechanical movement by the aid of magnetism which will permit the positive transmission of large powers at high velocities without the excessive noise incident to the use of toothed gearing. This is accomplished by the employment of smooth face iron pulleys or wheels which are made strongly magnetic by suitable windings connected in circuit with a suitable source of electrical energy, and by the use of endless belts, chains or ropes, which are either themselves magnetic, or carry iron bars (or both), which form armatures to close the magnetic circuits at the pulleys, and are strongly attracted to the faces of the pulleys so as to increase the adhesion and transmit the power without slip.

A variety of forms of pulley and belt can be used; the particular form shown is a wheel carrying a wire rope, and this form would be useful in those hoisting engines not provided with winding drums. In this class of hoist there is frequently trouble from slipping when the weights on the different ends of the rope are unequal, as, for instance, when a loaded car is going up and an empty one down, and in such cases the magnetic pulley would materially assist in equalizing the motion. This form of the device shows in Fig. 5 an iron wheel E provided with a grooved face in which runs a wire rope. The wheel is slotted circumferentially and provided with a magnetic winding f which strongly magnetizes the wheel, giving the opposite sides of its rim opposite polarities. The wire rope acts as an armature or keeper to the magnetic poles forming a magnetic circuit of exceedingly low resistance and resulting in a powerful adhesion of the rope to the wheel. Instead of winding the wheel E circumferentially, its rim may be provided with transverse grooves in which windings g will be placed, making the projecting surfaces of the wheels between these windings alternately of opposite polarity as indicated in Fig. 6. The wire rope acts as an armature or keeper for all the magnets thus formed.

Instead of winding each wheel or pulley, in cases where the wheels or pulleys are sufficiently near to permit of the employment of the construction, the pulleys are connected by an iron frame G., Fig. 7, which is provided with the magnet winding h. thus making one pulley of one polarity, and the other of the other polarity, a magnetic belt, rope or chain being used to complete the magnetic circuit between the two pulleys or wheels. This construction does not produce as powerful magnets as in the constructions already described. It is simply given as an illustration of the fact that the invention is capable of being carried out in many forms of construction, and is not limited to the special constructions illustrated.

Soft Iron for Dynamo Magnets.—The cores of the field magnets of the best types of dynamos are usually specified to be made of "best Swedish iron" or other pure iron made by the puddling process. In lower grade makes we believe that ordinary cast iron is often used, but for all standard purposes the pure puddled iron is still adhered to. Mr. James Muirhead, an electrical manufacturer, of London, states that he has recently been obtaining supplies of very pure iron from steel makers which is softer and purer than the iron made by the puddling process. This iron is produced in the Siemens-Martin furnace and the Gilchrist-Thomas converter, and is extracted therefrom before the addition of the manganese ore. Full details of this process are not yet available, but they will be published in a short time, when the electric and magnetic tests are completed. The dynamo makers who have used it express great satisfaction.

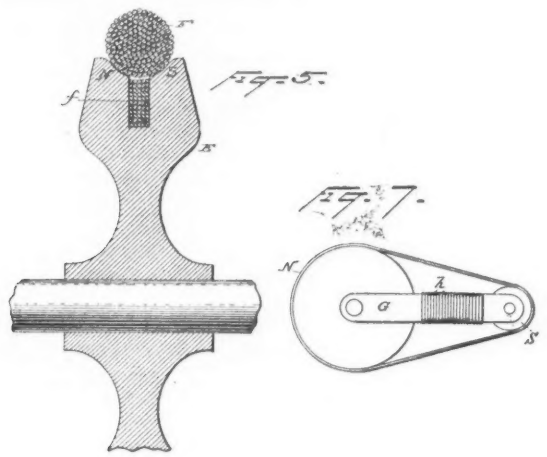
Electricity in Mining in France.—The Compagnie des Mines de Vicoigne et de Noeux has invited tenders from the principal electrical firms for the laying down of an important installation at its mines. The proposals call for the establishment of a central station, which will provide electrical power for the different works throughout the colliery. At present only two dynamos will be put in, of which the electrical force will be utilized at a distance of 4,400 metres, for the working of five winding gears of from 6 to 14 H. P. Five pumps operated by electric motors of 5 H. P., will be placed at the bottom of the mine, and electric locomotives, each of 12 H. P., will be employed for the conveyance of coal, at a speed of 12 kiloms. an hour, along the principal gallery, which has a length of 2,000 metres. The mine will also be illuminated by 26 arc lamps and 200 incandescent lamps, each of 16 c. p. This will be the first installation of its kind laid down in France.

The Magnetic Properties of Minerals.—In Bauerman's "Systematic Geology," page 298, it is stated: "Chrome iron and franklinite are magnetic, but it is not certainly known whether this is a special property or caused by finely interspersed magnetite." Other writers, including Dana, simply state that these minerals are magnetic, but do not make any comment as to its cause or origin. In order to investigate this property, Prof. A. Liversidge, of Sydney, New South Wales, has lately conducted a very extensive series of experiments with almost every iron ore from all quarters of the globe and with other bodies such as spenel, garnet, serpentine, bornite, tinstone conglomerate, artificially-prepared ferric hydrate, jeweller's rouge, chrome iron, franklinite, hornblendschist and dufrenite. Samples of each were ground in a porcelain mortar and crushed to a fine powder in agate mortar. An electromagnet capable of lifting 18 oz. was employed. In all cases but one, viz., pyrrhotite, where the mineral showed signs of a magnetic property, varying amounts of magnetite were separated out of the powder by the magnet. The magnetically separated portions were in every case analyzed chemically in order to make sure that they consisted of magnetite. Thus the magnetic properties of specimens of chrome iron, franklinite, spenel, garnet, some hematites and other minerals are found to be entirely due to the presence of particles of magnetite distributed through their mass, and only pyrrhotite shares with magnetite the inherent property of being attracted by the magnet.

THE BUCHANAN GRANULATOR.

The illustration given herewith shows a machine which is intended to occupy an intermediate place between the large breaker and the crushing rolls or pulverizers which complete the grinding of rock or ore. Where it is used, the capacity of the large crusher can be greatly increased, as the jaws may be opened wider, allowing a more rapid delivery. It is the usual practice of the makers of this machine to place an inclined grizzly or a revolving screen between their crusher and the granulator, the fine ore passing through the screens being fed direct to the rolls, and the coarse pieces over 1 in. passing to the granulator, where they are reduced to nut size and smaller. The receiving capacity of the granulator is 5×30 in., large enough to receive all the pieces too large for the rolls; in fact, it is intended to reduce the coarse fragments from the large jaw crusher, so that they can be treated without the expense of an additional set of coarse rolls. In plants employing crushers and rolls, where it is advisable to increase, within certain limits, the capacity of the mill, the introduction of this granulator will, it is claimed by the makers, be found advantageous as its first cost is less, it requires less space, less power, cheaper foundation, less cost for renewal of wearing parts than rolls, and reduces the wear and tear on the pulverizing machinery.

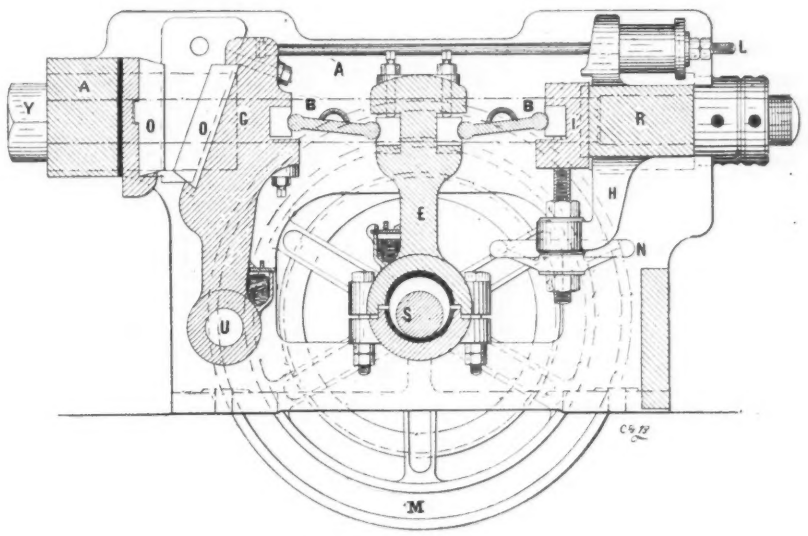
The cut shows a vertical section of the machine. A is the main frame, which is cast in one piece, and is very heavy and strong. C is



EDISON'S MAGNETIC PULLEY.

one of the swing jaws, which is pivoted at the bottom, on the steel pin U. This machine has double jaws, each 15 in. in width, working alternately, in order to reduce the strain, as the jaws are very wide in proportion to their opening. Motion is imparted to the jaws by means of the double-throw eccentric shaft S, pulley and flywheels M, pitman E and toggles B, B. The strain due to crushing is resisted by two steel tension rods Y, passing through heavy lugs, cast on the head of the frame A, and through holes cast in the movable tail-block R, which rests in suitable guides, cast in the frame A. The distance between the jaws, regulating the size of the product, can be adjusted while the machine is in motion by means of the nuts on the tension rods Y. The Buchanan granulator has an adjustable stroke, which is regulated by means of the adjustable toggle-bearings I on the tail block R, which can be moved up or down by the two hand-wheels N, which are threaded and fitted to a screw cast into the movable block I, and passing through yokes or brackets H on the tail block. The threaded hand wheels N are held securely in position by jam-nuts above and below the brackets H. The operation of the device is as follows: If the movable blocks I are elevated, the angle of the toggles B, B, will be increased thus increasing the throw of the swing jaw C; but if lowered, the angle of the toggles will be less and the throw of the swing jaw C will be reduced, thereby preventing packing and making a very fine product. The distance between the jaws and the length of stroke can be regulated without stopping the machine. The rubber spring and spring rod L are for the purpose of assisting the jaw C in its backward movement. The jaw plates O, O, are of chilled iron or hammered steel, and can be inverted when worn, as they wear faster at the bottom than at the top. The toggle bearings and the toggles B, B, are chilled at the seats and points to insure longer wear. The frame A is cored out around the journals for the shaft S and pitman E, leaving a large opening for oiling and adjustment of machine. All journals are provided with large grease cups or pockets fitted with spring covers to exclude the dust. The strains on frame, pitman and on all cast iron parts are in compression; the tension strains come on the rods Y and on other wrought iron or steel parts. These machines have been thoroughly tested, and have given satisfaction in use in a number of mills where they are working in connection with Buchanan crushers and rolls or with similar machinery. At present there are only two sizes made, 3½×30 in. and 5×30 in.; weight, 10,000 and 12,500 lbs., respectively; capacity, from 4 to 8 tons per hour, reduced from the size receivable to ¼ to ¾-in. ring gauge.

These machines are made by the Beckett Foundry and Machine Company, of Arlington, N. J., and were designed by Mr. C. G. Buchanan, engineer for the company.



BUCHANAN'S GRANULATOR.

Temperature of Combustibility of the Diamond.—According to Henri Moissan, who has already succeeded in preparing diamonds artifically, the temperature at which diamonds burn varies from 700° to 875° C., according to the specimen, and that the harder the stone the higher the burning point. Although the diamond resists the action of chlorine, and hydrofluoric acid even at a temperature of 1,200° C., it is easily attacked by the alkaline carbonates at that temperature with the formation of carbonic oxide. This experiment enabled M. Moissan to prove that the diamond contained no hydrogen or hydrocarbons.

Tempering Steel by Electricity.—A discovery which may have some useful application in the tempering of steel by the electric current is described by MM. Lagrange and Hoho in "Comptes Rendus." These gentlemen have been experimenting on the principle observed by Plante and others, that if a sufficiently strong current is passed through an electrolyte, the negative electrode being a fine wire, and the positive electrode a conductor of considerable surface, a kind of luminous sheath is formed round the negative electrode. The heat developed by this sheath is found to be very great, and by its means a very intense heat may be applied at any point of a body, while, on account of the rapidity with which the heat is disengaged, the rest of the body remains cold. The experimenters have applied this method to the hardening of steel. They heated by this means the outside of a bar of steel to a bright red heat, and then by merely stopping the current the cold electrolyte was allowed to come in contact with the hot steel. The outside of the steel bar was thus hardened to any degree of hardness, while the interior of the steel, having not been heated to any extent, remained soft and tough.

PATENTS GRANTED BY THE UNITED STATES PATENT OFFICE.

The following is a list of the patents relating to mining, metallurgy and kindred subjects issued by the United States Patent Office:

TUESDAY, APRIL 4TH, 1893.

494,566. Metal Shears. Elwood T. Horner, Cambridge City, Ind., Assignor to the Cambridge City Punch, Shear and Roll Company, same place.
494,567. Metal Rolling Machine. Eldwood T. Horner, Cambridge City, Ind., Assignor to the Cambridge City Punch, Shear and Roll Company, same place.
494,570. Process of and Apparatus for the Separation of Matte from Slag. Malvern W. Iles, Denver, Colo.
494,571. Apparatus for Separating Matte from Slag. Malvern W. Iles, Denver, Colo.
494,576. Metallic Culvert. Edward D. Lewis, Savona, N. Y., Assignor to Emmons T. Trumbull, Morice C. Trumbull, and James B. Disbrow, same place.
494,585, 494,586. Means for Electrically Heating Crucibles. Willis Mitchell, Malden, Assignor to the American Electric Heating Company, Boston, Mass.
494,587. Electric Coal Mining Machinery. Edmund C. Morgan, Chicago, Ill.
594,595. Gravity Railway. William R. Rightir, Helena, Ark., Assignor of one-fourth to John O. Bagwell, same place.
494,612. Valve Mechanism for Steam Pumps. Henry H. Westinghouse, Pittsburg, Pa.
494,626. Machine for Corrugating Sheet Metal Pipe. Charles J. Colling, Cincinnati, O., Assignor to J. M. Robinson & Co., same place.
494,637, 494,6'8, 494,639 Dredger or Traveling Crane. George W. King, Marion, O.
494,661. Self-Oiling Car Wheel. James H. Watt, Barnesville, O. Assignor to the Watt Mining Car Wheel Company, same place.
494,667, 494,668. Method of Coating Metal Articles. Francis J. Clamar, Philadelphia, Pa., Assignor to the Ajax Lead Coating Company, Camden, N. J.
494,715. Device for Polishing Precious Stones. Isaac Grasset, Geneva, Switzerland.
494,757. Manufacture of Oxides of the Alkaline Metals. Hamilton Y. Castner, London, England.
494,817, 494,8'8. Metallic Rod Packing. Samuel F. Long, Philadelphia, Pa., Assignor to the United States Metallic Packing Company, of Pennsylvania.
494,877. Apparatus for Excavating Wells, etc. George A. Miller, Colfax, Wash.
494,886. Caisson Driver. Theodore F. Perrenot, Rockport, Tex.
494,904. Metal Rolling Machinery. Edwin H. Story, Eccles, England.
494,940. Manufacture of Superphosphates. Ludwig Rissmüller, Newark, N. J., and Henry Vollbrecht, New York, N. Y., Assignors to the Newark Chemical Works, Newark, N. J.
494,956. Ammonia or Other Pump. Nils Johnson and John Stocker, St. Louis Mo.
494,972. Flexible Metallic Tubing. S. Lloyd Wiegand, Philadelphia, Pa., Assignor, to Robert S. Pettit, Atlantic City, N. J.
495,033. Ore Concentrator. James H. Montgomery, Denver, Colo.

PERSONALS.

Mr. William Allen Smith, mining engineer, has accepted the position of treasurer of the Harvey Steel Company, and will have his office in New York.

Mr. John Hays Hammond, mining engineer, of San Francisco, and president of the Bunker Hill and Sullivan Mining Company, of Wardner, Idaho, is in this city, en route to England.

Mr. Nicolas Kitaeff, chief engineer of the Russian Department of Mines, has been sent to South Africa by his government to study the methods of treating refractory ores in the Transvaal.

Mr. Joseph L. Colby, president of the Monte Cristo and other mining companies and the Puget Sound Reduction Company, has removed his office from Cleveland, O., to No. 36 Wall street, New York.

It is reported that Mr. Joseph S. Harris has been offered the presidency of the Philadelphia & Reading company. He is president of the Lehigh Coal and Navigation Company, and few men understand the anthracite trade better.

Mr. A. A McLeod has resigned his position as president and as receiver of the Philadelphia & Reading Railroad Company. It is understood that this action has been taken in consequence of the opposition of a large part of the bondholders to his management of the company.

OBITUARY.

Owen Hitchins, general manager of the Barton & George's Creek Coal Company, of Frostburg, Md., died at that place on March 21st.

Frank Underhill, of San Francisco, Cal., a prominent dealer in mining stocks for 15 years past, died at his home on March 28th, aged 41 years.

Amos C. White died in this city on the 4th inst., aged 85 years. He was born in Spencer, Mass., and early in life moved to Syracuse, N. Y., where he and his brother became extensively interested in salt works. About 40 years ago they came to New York and purchased the Globe Iron Works. He retired from business several years ago.

Hiram Berdan, the inventor of the Berdan long-range finder, torpedoes and rifle, died suddenly in Washington, D. C., on March 31st. General Berdan was born at Plymouth, Mich., about 1823. He was for several years in Russia, and entered into contracts for furnishing the Czar's army with large supplies of his rifles.

M. Belpaire, for 20 years past head of the department of motive power on the Belgian State Railroads, died recently in Brussels, aged 73 years. He was educated in the Ecole Centrale des Arts et Metiers, at Paris, and entered the Belgian service as an assistant engineer. While in charge of the shops at Malines he conducted some important researches in combustion, and introduced an improved grate for burning small coal, and also the type of firebox and locomotive boiler now so much used and known everywhere as the Belpaire boiler. At the International Railroad Congress in St. Petersburg last summer M. Belpaire was a delegate, and was made a vice-president. He was considered in Europe a high authority on all questions relating to combustion and boiler construction.

Mr. Deodatus H. Neale, who died at his residence in Brooklyn, N. Y., April 5th, aged 44 years, was born in England; he was educated for the profession of a mechanical engineer, was at one time chief draughtsman of the London & Northwestern Railway, and afterward assistant locomotive superintendent of the State railways of Cape Colony. In 1883 he came to the United States to report the Exposition of Railway Appliances at Chicago for an English paper, and a year later joined the editorial staff of the "Railroad Gazette" in New York. In 1888, he went to Australia as mechanical engineer to the Railway Commission of New South Wales. He resigned that position a few months ago and returned to New York, where he was engaged in some special technical work. He was a member of the British Institute of Engineers, of the American Society of Mechanical Engineers and of the Master Mechanics' Association.

SOCIETIES.

American Society of Civil Engineers.—At the meeting on April 5th, a paper by Mr. Walter McCulloh, "The Construction of a Water-Tight Masonry Dam," was read. The dam described was the Sodom Dam, on the Croton Aqueduct system, at what is known as "Double Reservoir I." or more familiarly as Sodom and Bog Brook Reservoir. The paper was followed by some discussion.

Mining Society of Nova Scotia.—The annual meeting was held in Halifax, March 29th. After routine business and the admission of new members Mr. W. G. Matheson read his paper on "Fuel Economy," which was highly commended by Messrs. Hardman, Poole, Reid, Hayward and other members in the discussion that followed. Not having been received in time to be printed in advance of the meeting, this paper will be open for discussion at the next meeting. A discussion followed on Mr. Alfred Woodhouse's paper on "The Occurrence and Reduction of Gold," in which the president, Mr. Hardman, Captain Macduff and other members took part, the opinion being that the principles laid down in the paper were so general and so indisputable as to call for little or no comment. Mr. B. C. Wilson's paper, "Notes on Some Special Features in Lode Formation and Deposition of Gold as Presented in the Waverley Gold District, Halifax, N. S." was also discussed. The society elected H. S. Poole president; J. E. Hardman and R. E. Leckie vice-presidents.

WORLD'S FAIR NOTES.

The Brazilian Commission to the World's Fair arrived in this city on April 2d. Senhor A. de Barros, a metallurgical engineer, is in charge of the sections of mines and mining.

A steamer, now nearly due at Boston from Liverpool, has on board a block of cannel coal weighing 12 tons, a most extraordinary find, as it is said to be impossible that there is another seam in the world where such a block could be mined. The expense of securing this block and getting it in readiness for shipment without breakage has amounted to £1,000, and the greatest care has been given to prevent chipping and otherwise marring the surface.

The Pottsville, Pa., "Chronicle" says: "The Philadelphia & Reading Coal and Iron Company has for some time past been collecting samples of anthracite coal, mined by them in this region, for an exhibit at the Columbian World's Fair Exposition at Chicago. A car has been loaded with coal and miners' tools, in the Pottsville yards, and shipped directly to Chicago. There were 163 boxes of coal in the shipment, consisting of the following sizes: Lump, steamboat, broken, egg, stove, nut, pea, buckwheat, rice and culm. The samples of coal were of the following varieties: Hard white ash, free burning white ash, Shamokin, Schuylkill red ash, Lykens Valley and Lorberry. Together with the coal was shipped a collection of the tools and implements used by the miners in removing the coal. The collection consisted of: Long drills, hand drills, safety lamps, common naked lights, blasting powder, powder cans, fuses, soap for making cartridges, shovels, picks, hammers, coal rakes and hooks, in fact, there are 41 different articles used by the miner in the coal breast and tunnel. The entire exhibit will be placed in cabinets among the Pennsylvania exhibits in the Mines and Mining Building."

The articles to be exhibited by the Bethlehem Iron Company at the World's Fair have left the ordnance works for Chicago. The display includes every kind of product turned out by the Bethlehem Iron Works from the rough ingots to the finished armor and guns with intermediate forgings. To give spectators an idea of armor there is an armor plate ingot and four finished plates. The ingot is represented by a wooden model. Such an ingot as the company wished to send was beyond transportation facilities. The model is rectangular, 18 ft. high, 8½ ft. wide and 52 in. thick, and is painted and roughened to imitate exactly the real. An ingot of these dimensions would weigh more than 250,000 lbs. Two of the armor plates are those that have withstood government tests. They are the first plain steel experimental plates, 6 ft. 4 in. by 6 ft. and 11½ in. thick; weight, 12,800 lbs; and the case hardened plates of experimental steel, 8 ft. by 6 ft. and 10½ in. thick; weight, 20,800 lbs. A third specimen is a nickel-steel ventilator for the "Puritan," 4 ft. high and 7 ft. in diameter. This armor is 6 in .thick. The heaviest and most representative specimen of armor in the exhibit is a nickel-steel Indiana barbette plate. It is 12 ft. 1 in. by 8 ft. 4 in. and 17 in .thick, weighing 69,800 lbs. Gunmaking is illustrated by 15 specimens of steel from the rough ingot to the finished guns. The ingot is 15 ft. long and 54 in. in diameter. It weighs 108,000 lbs. It was made in the liquid metal press. The tube is represented by one specimen. It is 13-in. bore, smooth forged, 38 ft. 5 in. long, 25½ in. in diameter. Its jacket, 17 ft. long and 38 in. in diameter, accompanies the tube. This jacket, which weighs 56,800 lbs., is almost as heavy as the tube, whose weight is 59,000 lbs. There are 10 smooth-forged gun hoops of various sizes, which will be arranged in pyramidal shape. The 10 hoops will weigh 45 tons, and will make a pyramid about 15 ft. high. Trunnions will be illustrated by a smooth-forged trunnion hoop for a 12-in. army rifle. It is 4 ft. in diameter, and weighs 5,100 lbs. The finished gun is a 12-in. navy rifle, whose forgings from the Bethlehem Ordnance Works were assembled at the Washington gun factory. It is 36 ft. 9 in. long, 3 ft. 9 in. in diameter and weighs 45 tons. The most striking specimen of shaft forging is a hollow forged shaft, black as when forged, 66 ft. 11 in. long. It is 20 in. in diameter, and has a hole of 8¼ in. inside. The hole was bored into the piece of ingot before the steel was put to the forge. The rest of the shafting is a double-throw crank, built up and finished for the Pacific Mail Steamship Company's "City of Sydney," 20 ft. 6 in. long; weight, 52,000 lbs.; a finished single-throw crank for the United States cruiser "Minneapolis," 115 in. long, weight, 4 tons; and a finished spare shaft for the Old Colony Steamboat Company, 39 ft. 5 in. long; weight, 66,000 lbs. There is also a White-head torpedo tube, 4 ft. 11 in. long and 17⅞ in. outside diameter. The steel is 1¼ in. thick; it weighs 1,140 lbs. With the exhibit went a cabinet filled with specimens of physical laboratory work. A full-sized model of the 125-ton steam hammer has already been built, and is in position at Chicago. The original in the hammer building at the ordnance works weighs 2,386 tons. The exhibit will be placed in the Main Building in Jackson Park.

INDUSTRIAL NOTES

The Aultman-Taylor Manufacturing Company, Mansfield, O., will add to its works a new boiler shop, 325×70 ft.

William B. Pollock & Co., Youngstown, O., have an order for six large boilers for a rolling mill at Durango, Mexico.

The Bellefonte Furnace Company's plant, at Bellefonte, Pa., will be blown in on April 15th, after being idle for three years.

The Walburn-Swenson Company, Chicago, have just erected a very complete concentration plant in the new zinc district in Southeast Missouri.

The Pennsylvania Steel Company, Steelton, Pa., is making good progress on its new open-hearth steel plant, which will have six 35-ton furnaces.

The Cumberland Iron and Wire Works, Nashville, Tenn., have made an assignment. It is believed that the company's affairs can be arranged.

The Gautier Steel Company, Johnstown, Pa., is putting up a building, 50×200 ft., in which will be placed a 14-in. train of rolls for making steel bars and rods.

The Jackson & Woodin Car Company, Berwick, Pa., has an order for 500 coal cars of 60,000 lbs. capacity for the Delaware, Lackawanna & Western Railroad.

The Berlin Iron Bridge Company, East Berlin, Conn., have received the contract for the new building for the New Haven Rolling Mill Company, at New Haven, Conn.

In accordance with a bill passed by the Ohio Legislature April 1st, the Ohio Steel Company, now erecting a large plant at Youngstown, O., will increase its capital stock from $750,000 to $1,000,000.

The plant of the East Lebanon Iron Company, of Lebanon, Pa., was totally destroyed on April 4th. The mills were ready to resume on the 5th inst., after several days' suspension. The fire will throw several hundred people out of employment. Loss, $50,000.

Judgments by confession, representing claims amounting to $20,000, were entered in the Circuit Court April 5th against the South Chicago Steel Casting Company, of Chicago, Ill. A bill for a receiver was filed against the company shortly after the judgments were entered. The assets of the company are estimated at $100,000, and the liabilities less than that amount. A petition for a receiver of the South Chicago Foundry Company, which concern is interested with the Steel Casting Company in several contracts, was also filed.

The Jeffrey Manufacturing Company, of Columbus, O., has completed arrangements with the Pittsburg Coal and Ore Dump Company, of Pittsburg, Pa., for the sole manufacture and sale of the Wilson patented automatic safety coal and ore dumps, tipple specialties, screens and mine carts; all of these will be made at the works in Columbus. The Jeffrey company, with the Wilson tipple specialties, will be in position to furnish complete mining outfits of designs to suit all locations and conditions. With special machinery and a competent force of men in charge of this work, they are prepared to furnish and erect machinery plants on short notice.

MACHINERY AND SUPPLIES WANTED AT HOME AND ABROAD.

If any one wanting machinery or supplies of any kind will notify the Engineering and Mining Journal of what he needs, his "Want" will be published in this column and his address will be furnished to any one desiring to supply him.

Any one wishing to communicate with the parties whose wants are given in this column can obtain their address at this office.

No charge will be made for these services.

We also offer our services to foreign correspondents who desire to purchase American goods, and shall be pleased to furnish them information concerning goods of any kind, and forward them catalogues and discounts of manufacturers in each line, thus enabling the purchaser to select the most suitable articles before ordering.

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3,021. A second-hand gas machine of 30 or 40 burners' capacity. North Carolina.

3,022. Latest approved gold mining, placer and crushing machinery. Alabama.

3,023. A small metal turning foot-power lathe or lathe head, suitable for gunsmith's purposes. Texas.

3,024. A 40 H. P. engine and a 50 H. P. boiler. Texas.
3,025. A small portable forge. Texas.
3,026. A 48 to 50 in. turning and boring mill. Pennsylvania.
3,027. A 60 saw gin. Texas.
3,028. A hand or foot-power drilling machine, self-feed, available for gunsmith's purposes. Texas.
3,029. An 18 to 24 in. shaper and keyseater. Pennsylvania.
3,030. A corn mill. Texas.
3,031. A small anvil. Texas.
3,032. Planing mill machinery. South Carolina.
3,033. A wood splitter. South Carolina.
3,034. Engine and dynamo, poles and wire to equip 3 miles of track. Georgia.
3,035. Improved brick machinery; also a dryer. Georgia.
3,036. A bending machine for a coffin factory. West Virginia.
3,037. A boss sander. West Virginia.
3,038. Prices on machinery for the manufacture of spokes, hubs and rims.
3,039. A gear cutting machine. Alabama.
3,040. 20 tons 20-lb. second-hand rails. South Carolina.
3,041. A 16-in. wood lathe. North Carolina.
3,042. A 20-in. cupola. Alabama.
3,043. A band sawing machine. North Carolina.
3,044. A blower. Alabama.
3,045. Rubber and leather belting. North Carolina.
3,046. A second-hand, 15-in. shaper. Alabama.
3,047. A small steam pump. Mississippi.
3,048. 3,000 ft. 1-in. piping. North Carolina.
3,049. Boiler and engine. Mississippi.
3,050. 12-lb. T-rails. North Carolina.
3,051. A complete outfit of second-hand machinery for a steamboat, 85 × 18. Georgia.
3,052. A large stationary iron tank that will hold at least 30,000 gallons of spirits and turpentine. Mississippi.
3,053. A lot of truck wheels to make dry kiln trucks. North Carolina.
3,054. Shafting. North Carolina.
3,055. A small complete telephone. Mississippi.
3,056. Babbitt metal. North Carolina.
3,057. A 500-light electric plant, all complete. Mississippi.
3,058. A mortising machine. North Carolina.

GENERAL MINING NEWS.

The annual convention of the United Mine Workers of America is in session at Columbus, O., 132 delegates present representing 15,000 numbers.

ARIZONA.

Yavapai County.

(From our Special Correspondent.)

Arrangements have been completed for putting a strong force of men at work on the Santa Fe, Prescott & Phoenix Railroad. The line when finished will tap a rich mineral section of country, and in People's Valley will pass the Senator, Congress and other mines. The line has already been built from Ash Fork, on the Atlantic & Pacific, nearly to Prescott, the remainder of the work being, however, the heaviest. In passing through the Bradshaw Mountains the cuttings necessary will entail much labor. The Joe Reynolds estate, owning the Congress mine, is the principal stockholder in the road, and F. Murphy, superintendent of the Congress mine, is secretary. The line will, it is expected, be completed by January, 1894.

CALIFORNIA.

(From our Special Correspondent.)

The Selby Smelting Works have received a bar of gold bullion from the property of Hubbard & Bowers, of the Harquahala mines, Arizona. It weighed 379 lbs., or 5,527 oz., and was valued at $96,168. Its dimensions were 5¾ × 13¾ in. on top, 6¾ × 15 in. on the bottom, and its height 8 in. It was the product of a 54 days' run of the mill.

Butte County.

Shakespeare.—A new quartz mill will be built at this mine at Forbestown during the coming summer. Work on the foundations has already commenced.

Calaveras County.

Gwinn.—It has been currently reported that S. H. Howland has secured an option on the Gwinn mine, located in the Gwinn Canyon, in Calaveras County, about a mile from Middle Bar, and at present owned by a son of ex-Senator "Duke" Gwinn. This mine in former days turned out a large amount of gold. The ore was very rich in most of the levels, especially in the 700, 800 and 1,300. The shaft was down 1,500 ft., with levels run from 300 to 400 ft. from the stations. Mr. Howland went direct to Boston to present the proposition of reopening the property to a number of Boston capitalists. It is stated that they will reopen the shaft and levels, construct a hoist and erect a mill crushing at least 100 tons of rock per day.

Sandy Bar Mining Company.—The developments being made at the Harrison mine, on Esperanza Creek, which was recently bonded by this company, are very promising, says the Calaveras "Chronicle." In the tunnel run to tap the ledge at a distance of 60 ft., a 4-ft. ledge was struck, showing rock running from $25 to $100 per ton. The ore just found is a soft, laminated quartz showing free gold. A lower tunnel, run to tap the ledge 275 ft. below present workings, is now being run, day and night shifts being employed.

Kern County.

Bright Star.—Parties who recently recommenced work upon this mine on Piute Mountain, says the Bakersville "Californian," have pumped all of the water out of the old workings and retimbered the old shaft, which is about 330 ft. deep. It is now reported that the present owners have found the old pay chute in the bottom level.

Mono County.

Bulwer Consolidated Mining Company.—The latest official weekly letter says: We are extracting ore from the various stopes, which are looking well. We crushed 122 tons of ore. The mill was kept running steadily. Average battery sample assayed $30.32 per ton; talings, $8.57 per ton.

(From our Special Correspondent.)

A gold-bearing ledge has been discovered near Benton that gives great promise.

Nevada County.

(From our Special Correspondent.)

Manzanita, Nevada City.—Some very good gravel has been struck 1,300 ft. below the top of the incline in the Nebraska & Live Oak lead.

Placer County.

Mayflower Gravel Mining Company.—The Placer "Herald" learns from President Chappellet that this company is getting up machinery for prospecting gravel mines by boring in a similar manner to the methods used in prospecting for oil, gas, coal, etc., in the Eastern States. The new machinery is about completed. It will have a capacity for boring a 6-in. hole from 800 to 1,000 ft. deep. The drill weighs 1,800 lbs. As they pass down the drillings will show the character of the formation, and when gravel is struck its depth and richness can be ascertained. Large and ancient river channels are known to lie below the surface on the Forest Hill and Iowa Hill divides, in this county. Their thorough development, it is believed, would open up productive mines.

San Bernardino County.

(From our Special Correspondent.)

Waterloo Mining Company, Calico.—The suit of John Doe against this corporation, on trial in the United States District Court at Los Angeles, and which involved the title to disputed ground in the mining claims, has resulted in a verdict for the plaintiff. Several suits are practically settled by this decision.

Vanderbilt Mines.—The reports being sent out from the camp are calculated to result in an excitement when the snow gets off the ground that will draw all the miners in the southern country to this vicinity. There is no reason to suppose, however, that Vanderbilt will ever be a poor man's camp, and it is by no means certain that the ore being taken out by the Mackay-Flood combination is as rich as reported. It is said that last week 70 tons of quartz was hoisted that ran $60 to the ton, and over 100 tons taken out averaged over $35 per ton. All the employees of the bonanza firm are under strict instructions to refrain from talking, and so what news filters through to the public may be discounted somewhat.

COLORADO.

Colorado Fuel and Iron Company.—This company's anthracite coal mine, at Crested Butte, closed down April 1st for the usual spring clean-up and repairs. The mine has run steadily for a year, producing more coal than ever, as the demand has rapidly increased. By another season the company will have a breaker running at Ruby-Anthracite, which is now in course of construction. Over 140 men are employed there at present, erecting buildings, putting in machinery, and developing coal openings, so that an output of 500 tons daily can be made.

Denver & Golden Smelting Company.—At Denver on March 30th Judge Rising granted an alternative writ of mandamus upon the petition of the New Golden Smelting Company against H. W. Hardinge, president, and Horace N. Chittenden, secretary of the Denver & Golden Smelting Company, ordering them to show cause why they do not deliver to the plaintiff certain shares of stock in the latter company. The complaint states that the plaintiff became the owner of 2,001 shares of stock in the Denver & Golden Smelting Company, valued at $25 each, of which certificates were signed in blank by the president and secretary, and that they refuse to transfer and assign the stock to them on the books of the company, or to issue to them stock to the value of that held by them.

Union Pacific Coal Company.—This company is boring a diamond drill hole on their lands close to Ruby-Anthracite, trying to find a vein of anthracite.

Chaffee County.

At St. Elmo the Mary Murphy Mine Company has commenced work again, at present working 10 men. The mill will not be started nor any ore shipped until the railroad is opened, which will not be before April. Mr. Morley, of St. Louis, is in charge and will push matters as fast as possible. The lessees of the Placer Mining and Milling Company are mining and shipping some fine ore. The Pawnee company is running its mill all the time that the ore can be taken down from the mine. The snow has put work back very much this winter, but the shipments of ore for the coming summer will probably be an increased production for St. Elmo.

Clear Creek County.

The following items of Silver Plume mining news are taken from our Colorado exchanges: A strike of importance is reported from the 90-ft. level of the Pay Rock, made by the party of Italian lessees. It is a big streak of ore, and was discovered about 200 ft. arther east than any ore body which previously had been opened in this property. The construction of the new dam across Clear Creek at Silver Plume for the purpose of obtaining more water power for the Pay Rock mill has been commenced, and will be pushed as fast as possible, so that it will be completed before the spring freshets. The raise from the Ashby tunnel to the Pay Rock shaft is progressing satisfactorily, and there is now less than 115 ft. of work to be done before connections will be completed.

It is stated that under the new management the Terrible property will be operated by contract and day's pay, instead of by the leasing system, which has been in vogue on this property for many years.

There are no indications of any of the mines around Silver Plume closing down on account of the low price of silver. The mines not only give profitable employment to all the miners in Silver Plume, but also to about 100 Georgetown men, who ride back and forth every day. The Mendota mine continues a heavy producer, and has shipped 15 cars during the past three weeks. The Stevens, Burleigh, Pelican, Corry City, Dunderburg and Seven-Thirty are also making their usual output this month. Now that there are at last some indications that the severe winter is about over, prospectors are beginning to make calculations on an active summer in that line. The East Argentine District, and especially McClellan Mountain, will receive the most attention, as several very promising prospects have been opened during the past year on that mountain. Development work has been done on two or three of them during the winter, and as soon as the weather becomes favorable work will be resumed on several more.

Custer County.

Bull-Domingo Mining and Leasing Company.—At the Bull-Domingo mine and mill, says the Silver Cliff "Rustler," about 50 men are employed. The output is reported as being good, and the mill is running steadily and successfully.

El Paso County.

Advices from Cripple Creek indicate considerable activity among the mines and mills of the camp. The Isabella company has bought the Smuggler claim, on Bull Mountain, for $25,000 cash. A large force of men began taking out ore. An 80-ft. shaft is being sunk on the Keen Cutter. The Sylvanite stamp mill, at Barry, has resumed work. The water in the shaft of the Solitaire, at Arequa, has led to the opening of a new shaft. The Matoa company has struck some fine ore at the bottom of its shaft, which is now 250 ft. deep. The owners of the Blue Bird have secured a patent, and have made regular weekly shipments since December 1st. The ore runs from 10 to 25 oz. in gold and from 35 to 90 oz. in silver. This is the only mine in the camp which has shipped ore to any amount that contained a few ounces of silver. The mill of the Gold and Globe company will begin operation about the middle of the month. There is enough ore on the dump of the Summit now to keep the 20 stamps busy a year. Twenty men are employed on the Summit lead, and this number will be doubled soon. Returns on a car of Pharmacist were received that went a little over $4,300. A half interest in the Gold Coin lode, on Gold Hill, has been sold for $1,000. Two shifts of men are at work developing this property.

Lake County.

(From our Special Correspondent.)

The Harrison Reduction Works, owned and controlled by the St. Louis Smelting and Refining Company, closed down entirely this week. What will be done with the plant is a matter of conjecture. This smelter is one of the oldest in the camp, and although many improvements were made the works could not compete with other smelters which have newer processes. It is known that the St. Louis plant has been losing money for some time. Several people are trying to get hold of the plant, but whether they will succeed or whether the present owners will rebuild and start up again is not yet known. At the other smelters here a great deal of mineral is being handled, while both the Holden and La Plata smelters expect to blow in some new stacks this week. The Holden will blow in two new stacks with a capacity of 100 tons each, making a total of four stacks. They are now handling the Grant, La Plata and several minor dumps. The Bi-Metallic Company is also about ready to blow in two more stacks, and have made many important improvements on their plant during the past month.

At the Maid and Henriette and Wolf Tone properties work is being vigorously prosecuted. The main Henriette shaft is in quartzite and going down rapidly. It seems that the carbonate bodies in the upper levels are practically exhausted, but there are some large bodies of sulphide ore from which shipments are made, averaging 175 tons daily from the Wolf Tone and 75 tons from the

Maid. Preparations are being made to sink an old shaft formerly known as the Harker, and located at the lower end of the claim.

There is a steady campaign of work going on in the Mahala mine, and shipments are now kept up to 100 tons daily of sulphide ore, which runs fairly well in silver. A great deal of excellent development work is being carried on in the lower workings, and considerable sulphide ore is blocked out.

The Frenchman, lying on Iron Hill, but which has lain idle for five years, is to be vigorously worked this season. The shaft of the Frenchman is down 415 ft., and it is believed that by a further sinking of 35 to 40 ft. the known ore shoot of the Humboldt property will be encountered.

The Vanderbilt lessees have been working that property by means of an incline, and at a depth of 170 ft. have caught some good ore running from 25 to 40% lead. This seems to be the edge of a large ore body. C. F. Loose & Co. are the owners of this property.

From the Gallagher shaft of the Mikado mine some 75 tons daily of good sulphides are being shipped. The present depth of the shaft is 580 ft., and the sulphide ore bodies seem to extend far below this depth.

San Miguel County.

Shipments of ore and concentrates from Telluride for the week ending March 31st amounted to 286 tons, a total since January 1st of 4.989 tons.

FLORIDA.

Phosphates.

Central Florida Phosphate Company.—This company is filling some large orders from its mines at Anthony. The company uses the hot air method of drying.

Foote Chemical Phosphate Company.—This company is putting in a new washer and disintegrator of the Mayfield pattern, built by the South Florida Machine Works, at Orlando.

French Company.—This company is now mining and washing from 75 to 100 tons daily, and will increase its facilities by putting in a new double log washer at Anthony. An electric light plant is being erected at the works.

Hopkins.—A New York party has bought 15 acres of the Hopkins property, near Anthony, and is preparing to begin mining operations.

GEORGIA.

Lumpkin County—Gold.

Findley.—Work has been resumed at this mine, near Dahlonega.

Griscom.—Mr. H. M. Stanley, the owner of this mine, intends to prospect it thoroughly.

Nahoola.—At this mine some very good ore was struck recently, and an additional force has been put on.

Phoenix Mining Company.—This company has been organized with $500,000 capital stock to succeed the old Etowah company. The company expects to begin work on the long tunnel to divert the Etowah River, with a view to working the present river bed for gold.

Richmond County.

A deposit of marl and phosphate rock has been discovered in this county. It is said that arrangements will be made at once for working it.

IDAHO.

Alturas County.

Upon instructions from New York, the Queen of the Hills group of mines is being pumped out.

Superintendent Carter, of the Minnie Moore mine, is expected April 1st, when active work will be resumed.

The North Star is being worked steadily, extracting enough ore to keep the smelter running continuously. The Hidden Treasure has just tapped the ledge and encountered a small body of ore. The Hard Times mine is being worked by six men.

Red Elephant.—About 200 tons per month are being shipped, with 45 men employed. The mill is working full time.

Star Mine.—About 25 men are now at work. A rich strike has been recently made in the inside winze of the lower tunnel level. Drifting from the shaft has been commenced.

Wood River District.—The War Dance mine has resumed work, after lying idle all winter. At the Wolf Tone four men are at work. The Bullion mine is looking well. The Jay Gould has quite a quantity of ore out. The Mayflower leasers are doing dead work, running a tunnel to tap the ledge 186 ft. deeper. The Barbarian leasers are piling up good carbonate ore. The Americus, Quaker City and Badger claims on Elkhorn Gulch are doing well. All leasers on Warm Springs Creek have some ore out.

Coeur d'Alene.

The trials of the strikers at Rathdrum have come to an end, the district attorney moving that all the cases be dropped and the prisoners discharged.

Lemhi County.

Italian.—The mine has worked all winter, says the Salt Lake "Mining Stock Journal." The poor work done by the former company has been straightened out and much new development work started. One winze is down 60 ft., in fair ground all the way; another winze is down 30 ft., and is in rich ore. There are 150 tons of ore on the dump ready for treatment. Ten tons of good milling ore can be produced daily with the present development.

Yellow Jacket.—This mine and the Cleveland, Lincoln and Continental groups, embracing in all 25 claims, have just been sold to Messrs. Thompson & Roeder, of Aspen, the price paid being, it is said, $160,000. The owners will erect a 50-stamp mill.

Owyhee County.

Black Jack.—There are over 400 tons at the mill which have been taken from drifts and an upraise. No stoping has been done of late. The drift on the vein is now in the third rich shoot of ore.

Trade Dollar.—The recent clean-up at this mine yielded 7,899 lbs. of concentrates, valued at $26,000, and four bars of bullion, worth $4,694; 230 tons of ore were milled.

Shoshone County.

Coeur d'Alenes.

Morning Mine.—Concerning the closing down of this mine, mentioned in our issue of April 1st, a correspondent of the Helena "Independent" says: The reason given by the management is that there is no profit in working it at the present prices of lead and silver and high rates of freight. The assertion is probably true. If there is a mine in the Coeur d'Alene that cannot afford to operate under these conditions it is the Morning. The ore is probably the lowest grade in the district.

MARYLAND.

Coal.

George's Creek & Cumberland Railroad.—This company and the Huntingdon & Broad Top will order 500 coal cars for the Cumberland trade.

MICHIGAN.

Copper.

Atlantic Mining Company.—The output for March was 229 tons, against 215 in February and 235 in March, 1892.

Calumet & Hecla Mining Company.—It will take four months more for the perpendicular shaft to reach the vein, as the 6th cross-cut to Calumet No. 4 has just been started. The shaft is now 3,000 ft. deep.

Centennial Mining Company.—The annual meeting of this company is called for April 12 in New York. President E. B. Hinsdale has issued an address to the shareholders, recounting the operations of the year, and asking them to assist in the development of the property by purchasing treasury bonds. Of an authorized issue of $300,000, $60,000 have been sold since the last annual meeting. The debt and resources at that time were about $40,000 each. This debt has been paid with the proceeds of the bonds and of copper sold. There are now no debts but the pay roll and supplies for the current month.

Franklin Mining Company.—No. 5 shaft has lately been producing a considerable amount of large and small mass copper, and a steam hammer has been ordered in consequence. March output was 184 tons, against 187 in February and 200 in March, 1892.

Hilton Mining Company.—At the annual meeting held March 31st the following board of directors and officers were elected: President, Thomas F. Mason; directors, Thomas F. Mason, William R. Todd, Joseph E. Gay, W. Hart Smith, Samuel B. Harris, of Michigan; secretary and treasurer, W. Hart Smith. The directors' report stated that at a special meeting held June 1st, 1892, the stockholders decided to have the company wound up and the property sold, but it was not to be sold for less than $10,000. The directors said they had been unable to get this price, in fact, could not get an offer at all, and recommended that the property be sold at private sale for the best price possible. This advice was adopted, and Messrs. Thomas F. Mason and Jos. E. Gray were authorized to make such sale.

Huron Mining Company.—The March output was 53 tons.

Tamarack, Jr., Mining Company.—Late advices from this mine are to the effect that the No. 1 shaft, which is now down to the 6th level, is showing a great improvement. The output has averaged from 40 to 45 tons per month for the past four months, and last month it increased to about 65 tons. Shaft No. 2 has so far been a disappointment, but now shows signs of improvement. Both the 3d and 4th level drifts have been extended south some distance, and have both opened up good stoping ground, says the Portage Lake "Mining Gazette." The winze sinking below the 4th level is down to the 6th, and has passed through ground that will pay to stope for its entire distance. The 6th level drift both north and south of winze is in a good looking lode. Not only is there an appreciable improvement in the appearance of the mine, but the return from the stamp mill shows that the rock is averaging higher in mineral than heretofore.

Marquette Range.

Lake Angeline.—The water has been lowered 40 in. since the small pumps were started.

Iron—Menominee Range.

Hamilton Mining Company.—At these properties a drift is being driven to connect the two main shafts, a distance of 125 ft. The intervening territory has been bored through with a diamond drill. With the shafts connected the company will use its building tank and endeavor to unwater the mine as speedily as possible.

MINNESOTA.

Iron—Mesaba Range.

Lake Superior Iron Company.—This company, which owns large mines on the Mesaba, has contracted with the Colby Iron Company to work them.

MISSOURI.

Jasper County.

(From our Special Correspondent.)

Joplin, April 3.

Saturday evening closed a very active week in the mines of the lead and zinc belt. The output of ore from each camp was heavy, and the average price paid was $22 per ton. Lead ore was in good demand, and the price advanced to $22.50 per thousand. New development is still continuing in almost every direction, but more particularly at and around Spring City, five miles south of Joplin, in Newton County. A town site has been laid out, and a number of buildings put up, including stores and dwelling houses. This development has caused the value of undeveloped lands to rapidly increase. Following are the sales from the different camps: Joplin mines, 2,059,500 lbs. zinc ore and 224,760 lbs. lead, value $27,195; Webb City mines, 413,010 lbs. zinc ore and 42,280 lbs. lead, value $5,369; Carterville mines, 2,780,080 lbs. zinc ore and 48,840 lead, value $30,959; Zincite mines, 161,330 lbs. zinc ore and 6,130 lbs. lead, value $1,869; Oronogo mines, 101,200 lbs. of lead, value $2,210; Carthage mines, 93,550 lbs. zinc ore, value $1,028; Wentworth mines, 49,600 lbs. zinc ore, value $496; Galena, Kan., mines, 1,574,430 lbs. zinc ore and 154,090 lbs. lead, value $19,050; district's total value, $88,176; Aurora, Lawrence County, mines, 1,806,430 lbs. zinc ore and 247,850 lbs. lead, value $17,831; lead and zinc belt's total value, $106,007. The Empire Zinc Company, of Joplin, are now actively engaged in the construction of buildings and appliances for the condensation of the fumes from their zinc smelters, and by April 20th will be producing zinc oxide. The Bartlett process is to be used. This new venture of the Empire Zinc Company is the result of experiments and tests made under the direction of Mr. W. C. Wetherell, general manager of the company. The Ruby Mining and Smelting Company, located south of the city limits of Joplin, is under the management of Mr. H. L. Green, who is working the mine with a force of 24 men, and is making a steady production of 30 to 35 tons of high-grade zinc blende ore per week. Most of this production is being made from exploratory work, as it is the intention to thoroughly prospect the extent of the ore deposit before commencing to stope.

MONTANA.

Deer Lodge County.

Champion Mining Company.—The long tunnel is now in about 300 ft., and is progressing favorably. At this point the tunnel has a vertical depth of about 150 ft. The workings follow one wall of the lead closely, though the latter has not been crosscut to ascertain the extent and value of any ore that may occur at present developments. Considerable water is coming in.

Puritan Mining Company.—The ore struck some time ago at the 300-ft. level continues to improve in quality.

Royal Gold.—During the winter a considerable amount of development work was done. Preparations are now being made to start the mill.

Sapphire and Ruby Company, Limited.—A shipment of 10,000 carats has been made from that part of the property called Ruby bar.

Jefferson County.

Alhambra.—A correspondent of the Butte "Miner," writing from this place, says: The Coles Bros. have started up their mill, which has stood idle for three months. Some development work has been done on the surface, but no explorations in depth have been made. The Euclid, in the same neighborhood, has been bonded to Eastern parties, who have agreed to sink a 200-ft. shaft and crosscut. At the Mayflower some galena ore is being taken out and prepared for shipment.

Lewis & Clarke County.

Blue Bell Mining Company.—In the suit between this company and the Northern Pacific Railroad Company about the site occupied by the Blue Bell lode, Assistant Secretary Chandler of the Interior has just decided that the claim is mineral and belongs to the mining company, thus confirming the decisions of the Helena land office and the General Land Office.

Sapphire and Ruby Mining Company.—Active preparations are being made to begin work on the Spratt fields early in April. Flumes, houses, etc., have all been built. Mr. H. F. Oviatt says that there is no difficulty in disposing of the stones.

Meagher County.

Broadwater.—A fine body of ore has been struck, says the Belt Mountain "Miner." It is 6 ft. wide and carries 4 ft. of galena.

Tiger.—This mine has received its new machinery, which includes two 45 H. P. boilers and an engine.

Silver Bow County.

Anaconda Mining Company.—A new shaft is to be sunk at the Anaconda mine. It will be similar to that of the Mountain Consolidated.

Boston & Montana Mining and Smelting Company.—The Butte "Miner" reports General Manager Couch as saying that all the smelting works of the company, located at Butte, will be closed down on June 1st. The upper works were closed down in January. It is also stated that the output of the mines will be reduced about 20 tons per day. From official sources this report is confirmed. We learn that this reduction takes place in accordance with a definite arrangement with this and other copper producing companies to restrict the output.

Butte & Boston Mining Company.—The output of this company for March was 1,634,000 lbs. of refined copper, 64,000 oz. of silver and $21,000 in silver bullion.

Columbia Gold and Sapphire Mining Company.—This company, recently incorporated in Butte, has for directors Alfred G. Johnson, A. F. Bray, D. W. McIntyre, J. McInerny and James Connell, all residents of Butte. The capital stock is placed at $500,000, divided into $1 shares, fully paid in and assessable. The object of the company is to develop the Rocky Bar, Gem, Diamond, Jewel, Conundrum, Bull Dog and Sonoma mining claims, situated about five miles northeast of Walkerville, in the Lost Child mining district.

Emma Nevada.—About ten men are employed. Returns from a carload of ore shipped to Omaha during the present month averaged 233 oz. in silver and $8 in gold to the ton. This ore was taken from the 100-ft. level.

Goldsmith.—Since its purchase by a St. Paul syndicate this mine has been largely developed, and it is now opened to a depth of 400 ft. Four of the five veins are being worked.

Kerry.—The lessees have made a strike of good ore in the 100-ft. level. A shipment of ore will now be made weekly.

Lone Pine Mining Company, Limited.—The directors have instructed Captain Prideaux to move the mill nearer the mine. Heretofore the mill has been obliged to shut down during the spring, owing to the bad roads.

Robert E. Lee Mining Company.—The stockholders held their annual meeting at Butte, March 29th. A. Wehl, J. P. Reins and J. Reinhart were elected trustees for the ensuing year. The officers elected are: President, A. Wehl; vice-president, J. P. Reins; secretary, J. Reinhart; treasurer, J. Chauvin. The treasurer's report for the past year showed a good cash balance on hand, which will probably be extended in further developing the property of the company.

St. Paul and Sultan Mining Company.—This company was recently incorporated at Butte by George B. Evans, Frank Dabney, Frederick J. Sheppard, Arthur P. Lathrop and Charles A. Moore, all of St. Paul, Minn. The amount of the capital stock is $125,000, divided into 27,000 shares of $5 each, fully paid and non-assessable. The operations of the company are to be carried on in St. Paul, Butte, and in and about Sultan City, in the State of Washington.

NEVADA.

Eureka County.

Jackson Mining Company.—This company, of Eureka, has held its annual meeting and elected directors, with William P. Shaw as president, W. E. Brown, vice-president and Oscar R. Jones, secretary. The assessment of 20 cts. per share, just levied, will be delinquent April 28th.

Esmeralda County.

A late issue of the Hawthorne "Bulletin" says: The miners in the War Eagle are taking out good ore. A shipment of 30 tons is now being hauled for reduction; this ore runs between $200 and $300 per ton. The Central mine is looking well; in places there are 3 ft. of good ore waiting to be stoped, and regular weekly shipments are being made. A lot of ore shipped from the New York by Poor & Hanson milled $24 per ton at the arrastra last week.

Storey County—Comstock Lode.

Mr. W. R. Eckart, the engineer of the Comstock Pumping Committee, returned to San Francisco on March 31st with all the necessary data to make his report.

Belcher Mining Company.—The latest official weekly letter says: On the 300-ft. level a northeast drift was commenced during the week and run a distance of 15 ft. The face shows quartz and porphyry. On the 350-ft. level the northwest crusscut No. 2, 100 ft. north of the north winze, is out 106 ft. The face is in porphyry. On the 400-ft. level the southwest drift is out 49 ft. The face shows porphyry. On the 600 level the southwest drift is in 44 ft. The face is in porphyry. We have hoisted 72 tons of fair-grade ore.

Justice Mining Company.—The latest official weekly letter says: The south drift from the north stope on the 822 level is out 139 ft. The face is in porphyry and low-grade quartz. We are taking out from the north stope, on the 822 level, about 5 tons of ore per day, the samples of which average about $20 per ton.

Savage Mining Company.—The latest official weekly letter says: On the 1,300 level the upraise in the ledge is advanced 50 ft.; top is in fair-grade ore. In the north stope, 30 ft. below the level, we have started an east cross-cut and have advanced some 17 ft.; face is in quartz and porphyry. On the 1,400 level the east cross-cut from the north drift, started 50 ft. north of the ore stopes, is advanced 127 ft.; this drift has reached the east clay of the vein. The west cross-cut from the north drift, started opposite the east cross-cut, is advanced 33 ft. in low-grade quartz. On the 1,800 level from the south boundary we have started a drift north, following the course of the vein; this drift is advanced 12 ft.; face in quartz of low grade. Shipped to the Carson mint March 23d 393 lbs. of crude bullion, being the clean-up of our ore worked at the Nevada mill.

Segregated Belcher Mining Company.—The latest official weekly letter says: The west crosscut from the lateral drift on the 1,200 level. 75 ft. north of the north line, is out 58 ft. The face is in very hard porphyry, with a small streak of low-grade quartz running through it.

West Consolidated California & Virginia Mining Company.—The Virginia "Chronicle" of March 22d contains the following: The property situated in Virginia belonging to the West Consolidated Virginia & California Mining Company, the sale of which was postponed since Wednesday, last, was sold to-day by Sheriff Quirck. The sale was made to satisfy an execution issued out of the District Court in the case of O. Steele vs. the West Consolidated Virginia & California Mining Company. There was found to be due Steele the sum of $3,654, with costs at date of judgment amounting to $106.40, accruing costs of $150, and interest on $3,654 from January 16th, 1893, until paid, at the rate of 7% per annum, and also the cost of the sale. The property was bought in by F. M. Huffaker for $3,943.33. Respecting the sale of the property of this company, the managers of the mine in San Francisco are quoted by the "Daily Report," of that city, as saying that the money necessary to satisfy the judgment upon which the sale was made was sent to Virginia City, but owing to a delayed train did not arrive there in time to prevent the sale. They also say that the money has since been paid over, and that the other parties will give back the property.

(From our Special Correspondent.)

The following is the weekly tabulated statement of ore hoisted from Comstock mines, with the car and battery assays, bullion shipments, etc.:

Mines.	Tons H'st'd	Car assay.	Tons Mil'd.	Bat'ry assay.	Bullion for week.	Bullion Shipped
Belcher....	72	.....	.....	.....	.....	.....
C. C & Va.	605	32.15	815	28.11	.....	[1]25,715.8
Justice.. ..	50	20.	.....	.... ..	.....	.....
Kentuck..	21	30	.....	.... ..	.....	.....
Ophir.....	31	20.85	.....	.....	.....	.....
Potosi.....	421	31.70	360	24.69	.....	417 lbs.
Savage.....	.....	.....	.....	.....	.....	[2]393 lbs.
Yel.Jacket	[3]126	.....	.....	.....	.....	.....

[1] Two shipments on March account. [2] Clean up at Nevada mill. [3] Good grade ore, shipped to Brunswick mill.

Kentuck Mining Company.—An average of 3 tons of ore per day is being taken from the stopes above the 160 level. The south drift from the east cross-cut of Jacket, 1,100 level has been carried 180 ft., and is in good grade ore.

NEW MEXICO.

Rio Arriba County.

Chama District.—A dispatch from Espanola says that numbers of prospectors and capitalists are still going into the Chama placers and copper mines, and all bring good reports from there.

Cook's Peak.—The mines at Cook's Peak are producing about a carload of ore a day, but this is only about one-fourth as much as the mines there produced last summer. Work has been suspended on some of the mines, and cannot be resumed until lead and silver bring better prices. A number of miners have taken leases in the mines at Georgetown, but the output will be light this summer.

Last Chance.—This mine, at Silver Creek, has been closed down, says the Silver City "Southwest Sentinel." Since the new mill was completed early last year the property has only been worked at intervals. There is a large vein of ore on the property, but most of it is so low grade that it will not pay to mine and mill under existing conditions. The mill is the largest in the district, but it has been kept running only a small part of the time since its completion.

Pinos Altos.—W. H. White, of Silver City, is developing some placer claims recently located on Bear Creek, below Pinos Altos. All the ground for about three miles along the creek has been located, and the results have been satisfactory. Placers have been worked in the Pinos Altos district for 20 years. The dirt is rich, but there is little water, so that the placers are not worked extensively, except when there are heavy rainfalls. There is considerable water in Bear Creek, and placer mining can be carried on there at all seasons.

PENNSYLVANIA.

Anthracite Coal.

The Laurel Hill Colliery, near Hazleton, operated by Pardee Bros., was flooded April 3d. Water from the Sugar Loaf mine, an adjacent property, burst into the Laurel Hill and imprisoned several miners, which, at this writing, have not been rescued, despite the efforts made to do so.

Delano.—A late dispatch from Delano states that brush fires are raging on the mountains in that vicinity, and it is feared that the collieries situated between Delano and Lofty will be set afire.

Dodson Coal Company.—This company is putting another large air compressor in its Plymouth mine. The first gave good satisfaction.

Lehigh & Wilkes-Barre Coal Company.—For some time past workmen of this company have been engaged in the erection of a big breaker at Ashley called the Maxwell, and miners have at the same time been sinking a shaft beneath it. Work, however, has been suddenly stopped. A late press dispatch from Wilkes-Barre says that it has been discovered that the engineers have made a mistake in the locations of the shaft and breaker, and missed three veins of coal they expected to strike. When the shaft reached the depth of 400 ft. and there was no coal in sight, resurvey was made, and the veins were discovered some distance away. The company has decided to abandon the shaft and drive a slope from the breaker to the veins.

Milnesville.—Workmen engaged in the Milnesville strippings on April 3d with a steam shovel plunged the implement into a mass of red hot coals. The fire came from the old Lattimer mines, and was supposed to have been extinguished long ago. Considerable money was spent in the effort to accomplish this end, and the last development proves the error of the conclusions.

Pennsylvania Coal Company.—This company's Barnum breaker, at Pittston Junction, which was burned down several months ago, is nearly restored, and will be in operation again very shortly.

Philadelphia & Reading Coal and Iron Company.—In reference to this company's tract between Newcastle and Glen Carbon, a dispatch says: About 40 years ago, while this land was being worked, fires originated at two different points. Every means then known was taken to extinguish the flames, but without avail, and the fire is said to have already consumed several million dollars' worth of fine coal. Before and during the seventies no less than three large collieries were in sucessful operation on these tracts, the Anchor, at Heckscherville; the East Pine Knot and West Pine Knot, at Greenbury and Coal Castle. Work had to be suspended and the collieries abandoned, owing to the fire. The Reading company has now determined to extinguish the flames, if possible, and borings are already being made to locate the present seat of fire. When successful the surface will be stripped above the veins and the fire then confined to its limit, and much good coal thus saved. The managers of the Reading company are confident this large area of some of the best coal in the lower Schuylkill region can be saved.

The company's statement for February shows: Gross receipts, $3,447,528; expenses, $3,551,655; improvements, $62,396; deficit for the month, $166,524. The proportion of the year's fixed charges for February increases the deficit to $234,524.

Neilson.—An explosion occurred at the Neilson shaft, at Shamokin, on April 1st which resulted in the death of 10 miners. The mine will have to be flooded in order to extinguish the fire which followed, and this throws 1,000 employees out of work. The mine is owned by J. Hangdon & Co., of Elmira. The fire started in a small wooden structure about 20 ft. from the bottom of the shaft. A careless miner was filling a burning lamp with oil when the explosion occurred.

Bituminous Coal.

Pittsburg.—The miners at the Vista mines in the fourth pool have agreed to dig "run of mine coal" at $1.37½ a hundred. This is equivalent to about $2.50 a hundred bushels, screened, ready for market. The coal is shipped to mills, and is used as it comes from the mine.

Monongahela Navigation Company.—The United States Supreme Court has decided in favor of this company in the long-pending suit over the condemnation of Lock. No. 7. The court decides in favor of the company, holding that the United States must pay for the franchise and right to collect tolls as well as for the lock and dam, notwithstanding the provisions in the act of Congress to the contrary.

Rothrock.—A Philipsburg dispatch says that R. B. Wigton & Sons have begun work on the shaft for the lower vein at Rothrock, near Morrisdale. The shaft will be about 130 ft. deep. The vein of coal is 4½ ft. thick and of good quality. The Wigtons will have 300 acres of coal, and the operation will give employment to a large number of men. Messrs. John Todd, Sr., Fred C. Todd; and John Todd, Jr., have leased the Lane tract of coal, near Philipsburg, and will begin work at once. The Lane tract embraces 350 acres of the Moshannon vein. The firm will be known as F. C. Todd & Co.

SOUTH DAKOTA.

Custer County.

Penobscot District.—With the exception of the Jopeline mine, in this district, but little work is being done, says the Rapid City "Republican." The co-operative miners' committee recently visited the Danbury property to see whether work should be started there, but no decision has, as yet, been reached.

Fall River County.

Mica Mines.—These mines, situated near Point of Rocks, and owned by J. B. Dickover, C. G. Fargo and J. M. Henton, have been sold to Dr. N. Lehen, et al., of Minneapolis. The price paid is said to be $25,000. Since the sale a contract has been let to run a tunnel and sink a shaft to develop the properties.

Lawrence County.

Alpha Mine.—The prospecting drift is in 50 ft., and although no ore has been cut the rock is highly mineralized.

Double Standard Mining Company.—The tunnel run by this and the Boscobel company was finished March 31st. It is 1,700 ft. long, and runs from Fantail to Nevada Gulch. During the last four months the average progress per day has been 5 ft. On the Fantail side a large pipe of ore was followed for nearly 1,000 ft.

Golden Reward Chlorination Works.—These works will shut down on May 1st for two weeks to undergo a thorough overhauling and cleaning up of the machinery. The plant has run about a year and a half with but a very few stoppages.

Hardscrabble.—Superintendent Maltener has a dozen men employed running a drift under the ore body.

Horseshoe.—The shaft is down 340 ft., the bottom being in sandstone. The water which has been a serious hindrance to the work is now under control, and work proceeds rapidly.

Lewis.—This and the Little Nell, Treadwell, Fraction and Blunderbuss mines have been sold to Mr. J. S. Childs, formerly superintendent of the Harney Peak Tin Mining Company. The purchase price was about $65,000. The property was examined by Mr. W. P. Jenney.

Minerva.—This mine is now nearly cleared of water. Many cases have occurred which involve considerable expense before the property can be worked.

Welcome Milling and Mining Company.—The double-compartment shaft on the Sundance mine is down 130 ft.

TENNESSEE.

Tennessee Coal, Iron and Railroad Company.—At the annual meeting in Tracy City, Tenn., April 5th, the following directors were elected: Nat Baxter, Jr., A. M. Shook, of Nashville, Tenn.; T. C. Platt, John H. Inman, Theodore W. Myers, James T. Woodward, C. C. Baldwin, John C. Haskell and W. S. Gurbel, New York; H. L. Debardeleben, T. C. Aldrich, David Roberts, T. T. Hillman and Walker Percy, of Alabama; C. F. Adler, M. E. Lopez and Augustine Smythe, Charleston, S. C. The directors elected Nat Baxter, Jr., president; H. L. Debardleben, vice-president; T. C. Aldrich, second vice-president and general manager, and James Bowron, secretary and treasurer. The reports made to the stockholders represented that the affairs of the company are in an entirely satisfactory condition. The directors were authorized to proceed with the construction of the steel plants in Alabama.

UTAH.

Mining Congress in Salt Lake City.—Messrs. J. H. Bacon, C. P. Mason, S. H. Hill and W. C. Higgins were recently appointed a committee to collect money to defray the expenses of the mining congress, to be held in this city; $3,000 were collected the first day.

Juab County.

Bullion-Beck Mining Company.—Mr. H. S. Hyde, of this company and brother of Manager Hyde, was shot by two strikers on March 31st. Up to this time the strike has been conducted in a peaceful manner. The company now has a large number of men at work, and the backbone of the strike is broken. A late report states that four men were dangerously wounded by the falling of a new cage.

Pi Ute County.

Dalton Mining Company.—The drift driven to catch the ore under the shaft has been completed, and the company has begun an upraise to connect with the bottom of the shaft. The lower drift has been run in fair-grade ore for about 200 ft. A cross-cut will be made to get the main body of ore as soon as the connection is made to give air.

Salt Lake County.

Copper Plant.—The new smelting plant, at Salt Lake City, will be located on the east side of the Jordan. A force of men is now at work on the site. Mr. Stallman has advertised for bids for materials, and the contracts will be let as rapidly as possible. The circulars sent out by Secretary Pearson, of the Business Association, requesting half of the copper plant subscriptions, is receiving an early response. There are about 800 subscribers altogether.

Summit County.

California.—The lower tunnel is 350 ft. in and advancing rapidly. The rock looks favorable.

Mackintosh Sampler.—The new sampler will be located a few hundred feet below the Crescent concentrator on ground belonging to old Park City Smelting Company.

Park City.—In spite of the low price of silver there will be a large amount of prospecting done during the coming summer, says the Park City "Record." It adds: The Park camp is in better condition to-day than ever before.

Silver King Mining Company.—The company has decided to enlarge the shaft from one to three compartments. While this is going on no ore will be extracted.

Tooele County.

No-You-Don't Mine.—It is said that the ore body recently found at a depth of 300 ft. is steadily improving in quality. The vein is 4 ft. wide.

Washington County.

Barbee & Walker Mill.—The old mill at Silver Reef, which has been remodeled so as to run by water power, will be started up in a short time. It has a capacity of from 50 to 75 tons a day. Chloriders are at work mining low-grade ore.

WASHINGTON.

According to a Spokane correspondent of the New York "Sun" a rich gold strike has been made near Hayden Lake. It is an extension of the Murray belt, and is rich in free milling gold.

Carbonate Mine.—A tunnel has been run in 100 ft. and a shaft sunk 20 ft. At that point the vein is 4 ft. wide. The ore is said to carry about 200 oz. silver and $3 in gold.

Stevens County.

Northport.—According to the Colville "Republican," Capt. S. H. Burbridge, who represents a number of California mining men, has selected this place for the erection of a smelter, to cost $60,000. He has already contracted with the Le Roi mine for 100 tons a day. The pyritic process will be adopted.

Old Dominion.—A 6-ft. vein of carbonate has been struck in the upper workings, according to the Colville "Republican." A large force of men have been put on. It it reported that a force will soon be put on the Ella, which is an adjoining claim.

Young America Concentrator.—This company started operations on April 1st. The mill has received a thorough overhauling. There are 3,000 tons of ore on the dump, which will last until the roads permit transportation.

Walla Walla County.

Within a few weeks prospectors have located over 60 claims along the Snake River in the county. Great excitement has ensued in consequence.

WEST VIRGINIA.

West Virginia Oil and Gas Company.—The lands belonging to this company, comprising about 10,000 acres have been bought by the Standard Oil Company.

Coal.

New River.—Among those who have either applied for leases in the New River coal field, or are making arrangements preparatory to doing so, are, the Great Kanawha Coal Company, of Mount Carbon; the Bellmont Coal Company, of Crown Hill; Longdale Iron Company; the Fire Creek Coal and Coke Company; Patterson Bros. & Company, of Piketon, O.; M. M. Warren Cott, of Pittsburg; A. Richart, of Covington, Ky.

FOREIGN MINING NEWS.

MEXICO.

Anglo-Mexican Mining Company.—The Superintendent's report to the directors states that the ore in the Coche drift is showing marked improvement and now runs from 188 to 362 oz. of silver. The vein is 3 ft. wide. On the east drift from the Santa Margarita tunnel the ore has also showed increased value, the last assay giving 62 oz. silver.

(Special Correspondence of Richard E. Chism.)

On resuming the task of special correspondent to the Engineering and Mining Journal I find a notable change in mining affairs in Mexico since my last communication, some three years ago. Within the last year a radical change has been made in the mining laws of this republic, whereby the old working tenure has been done away with, and the mines are now held by payment of a yearly rent which supersedes the necessity of work. The former owner has become a tenant, and continues in possession so long as the rent is paid. All the old titles have been or are to be renewed under the present law and a heavy sum comparatively has to be paid to the government, in the form of a stamp duty, for the renewal. The new law seems to have been hastily drawn, and its provisions, some of them, are particularly obscure and inconsistent, and have had to be explained by a multitude of circulars. All of these things have excited a lively spirit of discontent in the mining community which has led to the abandonment of numerous mines, and may result in a marked diminution of the silver product of Mexico.

The conditions of silver production in Mexico are, however, more favorable than those of any country in the world at the present time. Enjoying the benefits of prompt communication and of a stable government and of a climate that permits work all the year round, the Mexican miner has the additional advantage of paying his labor with the same silver he produces, while he can sell the surplus of his product for gold. Numerous American enterprises have been prompt to see and quick to avail themselves of these advantages, among them Mr. J. B. Haggin, of San Francisco, probably the most fortunate miner in the world, who has recently erected a great plant, designed by the best constructors, built of the finest materials and run by the choicest metallurgical talent to be had for money, in the camp of Guancevi, in Durango, and is making a big success, as I am informed. Nothing will be more likely to attract foreign capital to this republic than the spectacle of Mr. Haggin's success; and even disappointed speculators will have to acknowledge that there is nothing mysterious about Mexican mines and no obstacles in mining here that cannot be overcome by good sense, science, perseverance and good management.

Notwithstanding that the low price of silver has worked more apparent than real harm to the mining industry in Mexico the apprehension of a general crash has been sufficient to induce a great deal of interest in the production of gold. There is really a great deal of the yellow metal in this country, but very little of it has been mined and a great deal of what has been mined has been wasted owing to the fact that silver has always been so abundant, so valuable, and so easily treated metallurgically by apparatus of local manufacture of low first cost reasonable efficiency and easy management.

The extraction of gold from quartz veins is much more complicated, and must be undertaken on a large scale with machinery capable of handling large amounts of ore daily. This machinery must be bought in foreign countries, transported and set up at heavy expense and worked by skilled metallurgists, all of which demand a heavy outlay of capital before a single ton of rock can be crushed, besides the capital needed to open up a sufficient reserve in the mines to be able to keep the mill in steady operation. Owing to the happy-go-lucky methods that have usually been in vogue in Mexico, most Mexican capitalists, even those who are miners themselves, regard a mine as about on a par with a faro bank, and are prone to invest whatever they have gained through a sudden *bonanza* in real estate or in other financial operations that require no auxiliaries to accumulation of capital except an iron safe and a pair of scissors. As the result the rule in Mexico has been to do the best they could and to save whatever gold they could in the *arrastra* or on the *patio*, which amounted with good luck to some 40% of the contents of the ore.

It is safe to say that since the Spaniards began to mine in Mexico more gold has been thrown away than would cover the silver product thrice over. It is also safe to say that, now capital has begun to accumulate in Mexican hands and to come in from outside, and the railroads to make communication and transportation easy, and silver gone down, there will be a gold boom here and that within less than ten years, the gold product of Mexico will equal or surpass the value of the silver product at the same period.

Since I left off writing at the time I mentioned, a new factor in metallurgy has made its appearance in this country, and that is the existence of several large smelters, built in modern style, in fact with the finest and latest appliances known to metallurgical science, that have sprung up mainly through investment of American capital at various points throughout the country. When I last wrote these were *in posse*. It needed a Windom to call them from the vasty deep, and he did so most effectually. Every problem in the way of Mexican smelting is solved. The supply of ores, about whose existence there was never any doubt, is assured to the smelters by the railroads. Coke can be had from England, Alabama, Indian Territory or Sabinos; and again, the railroads that haul fuel in, distribute the product of base bullion through their deep water connections to the markets of the world. Owing to different obstacles that have had to be met in introducing practically a new industry, these smelters have not yet had a full swing. In another place, however, I estimate the lead product of Mexico during 1892 as some 27,000 tons, and this is only a fraction of what it might be and probably will be in a few years if the demand warrants.

MINING STOCKS.

[For complete quotations of shares listed in New York, Boston, San Francisco, Aspen, Colo.; Baltimore, Pittsburg, Deadwood, S. Dak.; St. Louis, Helena, Mont.; London and Paris, see page 336.]

NEW YORK, Friday Evening, April 7.

The old record of a dull week and of trading unrelieved by even a single feature of interest must be repeated this week. No event of importance has occurred in the mining stock market this week.

The Comstocks generally were very quiet. Of Crown Point 200 shares were sold at 80c. Consolidated California & Virginia declined from $2.45 to $2.25, with total sales for the week of 515 shares. Hale & Norcross shows a solitary sale of 100 shares at $1. Gould & Curry declined from 75c. to 55c.; total sales 300 shares. Comstock Tunnel was the most active stock this week; it was stationary at 10c., and was traded in to the extent of 3,200 shares. The bonds were in fair request. Other sales were as follows: 100 shares of Bullion at 55c., 100 shares of Chollar at 65c.; 300 shares of Exchequer

at 30c.; 400 shares of Mexican at $1.35@$1.40; 300 shares of Union Consolidated at 80c.@$1.05; 150 shares of Ophir at $2.20; 250 shares of Savage at 60@70c.; 200 shares of Sierra Nevada at $1, and 300 shares of Yellow Jacket at 50@55c.

Of the Tuscarora stocks Navajo shows a sale of 200 shares at 10c.

Of the California shares we note sales of 300 shares of Bodie Consolidated at 25 to 40c. There was a solitary transaction of 100 shares of Quicksilver, common, at $2.50. During the month of March the output of the Standard Mining Company amounted to $20,800, the expenses for the same period were $14,100, leaving a net profit for the month of $6,700. Sales of Belmont this week aggregated 1,600 shares at 20 to 23c., and of Brunswick Consolidated, 2,200 shares at 8c.

Of the Colorado stocks Chrysolite shows sales of 500 shares at 21c. Leadville Consolidated was in good demand, the total sales amounting to 2,200 at 17@19c. Of Little Chief 600 shares were sold at 21c. and of Small Hopes at 85c.

Ontario continues in fair demand. During the week 130 shares were sold at $16 50@$17.

El Cristo was lower this week; 700 shares were sold at 35@45c. Monte Cristo was quiet; only 550 shares were sold at $3.10@$3 15.

Phœnix of Arizona was traded in to the extent of 1,200 shares at 25@30c. The Reorganization Committee, consisting of Messrs. William S. Alley, James Arden Harriman, Theodore H. Silkman, George B. French and Oren F. Browning, is now ready to report to the stockholders of company. By next week the detailed plans, etc., will be in possession of each stockholder. Through the courtesy of a member of the committee we are enabled to publish in advance the main features of the plan of reorganization, which is substantially as follows: The property of the company which may be sold at judicial or other sale is to be purchased by the committee and transferred to a new corporation. This corporation will be organized under the laws of New Jersey or elsewhere (as the committee may determine), which shall issue the following new securities: Fully paid up and non-assessable common stock, 600,000 shares at $1 each, $600,000; first mortgage 6% bonds (maturing five years from their date), not to exceed $75,000. The indebtedness of the company is about $97,000, divided as follows: Bond secured by first mortgage on the property (interest accrued since October 3d, 1892), $10,000; notes and bills payable (with interest to April 1st, 1893), about $39,735.84; unsecured claims, about $16,917.48. Of this $97,000-debt the creditors have agreed to take $37,000 in cash and $60,000 in bonds. It is proposed that each holder of the old stock shall pay an assessment of 20c. per share, for which he will receive one share of the new stock for one of the old. This will bring into the treasury of the new company $120,000 in cash. The committee has received a proposition from Messrs. Fraser & Chalmers to furnish and erect upon the property a 100-stamp standard gravity mill with a guaranteed capacity of 300 tons of ore per day. Messrs. Fraser & Chalmers will also undertake to run the mill for one month after it is erected, complete and ready to start. For this the consideration is $75,000. This sum added to the $37,000 cash, which must be paid to the creditors of the old company, makes $110,000, which are to be subtracted from the $120,000 collected from the assessment, leaving a cash balance of $10,000, and $15,000 worth of bonds. All these are outside figures and large allowance has been made for unforeseen contingencies. About two-thirds of the stock and 90 per cent. of the indebtedness have already been pledged to the committee. The State Trust Company will be the depository of the cash received from the assessment, and other securities. The old stockholders will be allowed until May 1st to pay the assessment of 20 c., and participate in the plan. In our next issue we shall have further details on the plan of reorganization. The foregoing information is printed exclusively in the ENGINEERING AND MINING JOURNAL.

Boston. April 6.

(From our Special Correspondent.)

The occurrence of two holidays in one week has served to intensify the dullness which has of late pervaded the market for copper mining shares, and there is very little of interest to report. On April 4th there was a little spurt, and the transactions were larger on that day than on all the balance of the week combined, but it did not last, and yesterday the business was almost at a standstill again. It is thought that there will be no active speculation in copper stocks this spring on account of the low price of ingot copper, as only the strong companies can make money by its production on the present basis.

Calumet & Hecla can doubtless mine its copper at a good profit, and its stock is in fair request for investment at present figures. Sales the present week were from $307 to $310, mainly at the lower figure which is a loss of $5 for the week. The last saleyesterday was at $310.

Tamarack was dealt in only in a small way at $163@$161, while not a sale of Quincy was reported. Osceola declined $1@34¼ on small sales. Franklin sold at $12⅝ down to $12¼, closing sale being at $12¼. Centennial and Kearsarge were both heavy, the former declined to $8 and the later to $8⅛. Tamarack, Jr., declined to $21½, with later recovery to $22. The Montana stocks were both heavy. Boston & Montana declined to $30¾, and Butte & Boston to $9¼. There was more disposition to sell these stocks than usual.

Wolverine sold in a small way at $2¾, and Santa Fé at 5c. The balance of the list was entirely neglected.

Dunkin silver was quoted at 14c.

To-day being Fast day in Massachusettes there was no session of the Exchange.

San Francisco. March 31.

(From our Special Correspondent.)

The north end Comstocks have been in demand during the early part of the week at enhanced values. The activity in trading in this line of stocks was not maintained, however, and the market would have again stagnated had not a demand for Gold Hill stocks sprung up. The stimulation in this direction of the market was short lived, prices sagging back several points. As a general rule, however, prices show decided advances on the rates ruling a week ago.

While the members of the Stock Exchanges have never rendered themselves remarkable by their attention to religious observances they might without any injury to their interests have adjourned yesterday until Saturday.

As might have been expected, the general public observed Good Friday more or less closely and trading in the Boards was very limited.

Consolidated California & Virginia has sold during the week to $2.35, but to-day ruled at $2.25; this latter price, however, being 10 cents stronger than last week's ruling price. Ophir ruled to-day at $1.45. A couple of points decline on last week's rate; Mexican at $1.35; Sierra Nevada at 95 cents, and Union Consolidated at 70 cents.

The middle Comstocks have fluctuated very little, prices showing on an average a one point decline on the trading done during the current week. To-day Best & Belcher ruled at $1.35; Chollar at 60 cents; Gould & Curry at 60 cents; Hale & Norcross at $1.00; Potosi at $1.55; and Savage at 60 cents.

Of the Gold Hill and Southend Comstocks Belcher and Kentuck have been the most in demand. In the latter the good ore being stoped out, and the reports current of the work being done, sent the stock from 15c., the ruling rate last week, to 35c., the prevailing rate to-day Belcher sold for $105, an advance of 20c. during the week. Alpha ruled at 15c.: Alta at 15c.; Bullion at 35c.; Caledonia at 15c.; Challenge Consolidated at 40c.; Confidence at $100; Consolidated New York at 15c.; Crown Point at 65c.; Occidental at 10c.; Overman at 30c., and Yellow Jacket at 50c.

In the Bodie group, Bodie Consolidated has sold for 20c.; Bulwer Consolidated for 35c.; and Mono for 25.

The remaining outside stocks are still being kept in the background with barely a quotation obtained. Belle Isle, Grand Prize and North Commonwealth are held for 10c.; Navajo for 5c.; North Belle Isle and Nevada Queen for 15c.; Quijotoas, Crocker and Peerless are held for 5c.; Peerless for 20c., and Silver King for 25c.

SAN FRANCISCO, April 7th (*By telegraph*).—The opening quotations to-day were as follows: Best & Belcher, $1.40; Bodie, 20c.; Belle Isle, 10c.; Bulwer, 30c.; Chollar, 60c.; Consolidated California & Virginia, $2.25; Eureka Consolidated, $1.50; Gould & Curry, 65c.; Hale & Norcross, 95c.; Mexican, $1.30; Mono, 20c.; North Belle Isle, 15c.; Navajo, 10c.; Ophir, $1.95 (assessment delinquent); Savage, 55c.; Sierra Nevada, 90c.; Union Consolidated, 70c.; Yellow Jacket, 65c.

MEETINGS.

Bulwer Consolidated Mining Company, at the office of the company, No. 309 Montgomery street, San Francisco, Cal., April 12th, at 12 o'clock noon.

Champion Mining Company, at the office of the company, No. 329 Sansome street, San Francisco, Cal., April 11th, at 3 p. m.

Marshall Basin Mining Company, at the office of the company, room 34, No. 53 Broadway, New York City, April 19th, at 10.30 a. m.

DIVIDENDS.

National Lead Company, dividend of one per cent. on the common stock, payable May 1, at the office of the company, No. 1 Broadway, New York City.

General Electric Company, dividend of two per cent. on the common stock, payable May 1, to stockholders of record April 18.

METAL MARKET.

NEW YORK, Friday Evening, April 7, 1893.

Prices of Silver per Ounce Troy.

April.	St. Ex.	London Pence.	N.Y. Cts.	Value of sil. in $1.	April.	St. Ex.	London Pence	N. Y. Cts.	Value of sil. in $1.
1	4 87⅛	38⅛	83	·631	5	4·87⅛	38	82¾	·629
3	4·87⅛	38⅛	83	·631	6	4·87⅛	37⅞	82⅛	·627
4	4·87⅛	38⅛	83	·631	7	4·87⅛	37⅞	82⅝	·628

The dullness prevailing at the Easter holidays has interfered with the activity of silver. Not much business has been done with London. The difficulty experienced by the India Council in obtaining their minimum price for bills has operated against any advance in the price of the white metal. Supplies for the month of March were larger than estimated, but bullion has not been coming forward quite so freely the past week.

The United States Assay Office at New York reports the total receipts of silver for the week to be 93,000 ounces.

Government Silver Purchases.

The Government has purchased during the week the following quantities of fine silver at the accompanying prices per fine ounce:

April 3d, 340,000 oz., at 83·55 to 83·60c.
April 5th, 350,000 oz., at 83·2 to 83·25c.
April 7th, 411,000 oz., at 83·05 to 83·2c.

Coinage at the Mints of the United States.

WASHINGTON, D. C., April 1st, 1893.

The following report shows the coinage executed at the mints of the United States during March, 1893:

Denomination.	Pieces.	Value.
Double eagles	57,518	$1,150,360.00
Eagles	30,022	300,220.00
Half-eagles	167,027	535,135 00
Quarter-eagles	30	75.00
Total gold	194,597	$1,985,790.00
Standard dollars	140,320	$140,320.00
Half-dollars	320	160.00
Columbian half-dollars	2,062,105	1,031,052.50
Quarter-dollars	304,320	76,080 00
Dimes	560,320	56,032.00
Total silver	3,067,385	$1,303,644.50
Five cents	1,615,020	$80,751.00
One cents	5,261,020	52,610.20
Total minor	6,876,040	$133,361.20
Total coinage	10,138,022	$3,422,795.70

Imports and Exports of Metals into United States During February of 1893 and 1892.

IMPORTS.

		1893.	1892.
Iron Ore	Tons.	55,933	85,115
Pig Iron	"	4,155	8,158
Scrap Iron and Steel	"	373	4.524
Bar Iron	Lbs.	2,185,354	2,026,891
Steel Bars, Blooms, Billets, etc.	"	5,236,034	6.685,771
Wire Rods, Iron or Steel	"	3,640,918	7,930,437
Sheet and Taggers, Iron and Steel	"	5,224,477	3,419,442
Tin Plates, Terne Plates	"	41,083,838	42,338,245
Tin in Pigs, etc	"	2,077,384	3,013,315

EXPORTS.

Copper Ore and Matte	Tons.	1,300	2,723
Copper Ingots, Bars and Old	Lbs.	2,138,329	3,042,570
Pig Iron	Tons.	1,082	1,225
Bar Iron	Lbs.	128,385	126,030
Ingots, Bars and Rods Steel	"	30,095	50,748
Iron Nails and Spikes	"	1,023,988	1,065,758
Wire	"	3,010,134	1,930,882
Zinc Ore	Tons.	None.	147
Zinc Pigs, Bars, etc	Lbs.	612,659	1,111,565

Gold and Silver Exports and Imports at New York for Week Ending April 1st, 1893, and for Years from January 1st, 1893, 1892.

	Gold.		Silver.		Excess of
	Exports.	Imports.	Exports.	Imports.	Exports.
Week	$645,125	$107,180	$620,481	$1,425	$1,157,001
1893	34,345,303	5,152,830	7,567,496	850,237	35,907.726
1892	12,767,525	5,724,413	6,648,858	355,252	13,336,718

During the five days ending April 7th the exports and imports, so far as ascertained, have been as follows: Exports, gold, $2,112,190; silver, $311,463; imports, gold, $508.389; silver, $17,466. Of the gold exported $1,500,000 was American coin for Bremen and $117,355 American coin for the West Indies and South America; $489,365 Spanish alfonsos were sent to Havana. Of the silver exported all but $16,500 was American for London. Of the gold imported $487,000 was from France. No American gold coin was imported.

NOTES OF THE WEEK.

In our issue of March 18th we pointed out that easier rates for money would surely be followed by exports of gold, which statement we supplemented in the following week by saying that no gold of consequence would be shipped until after the usual disbursements of April 1st. That our prediction was justified the course of events has since shown. On April 4th $1,500,000 was sent to Bremen. $500,000 more will go to-morrow, and this in all probability will be followed by about $2,000,000 on Tuesday next. The amount of money paid out and to be paid by railroads, industrial and other corporations during April has been estimated at from $100,000,000 to $150,000,000. The only exact data on the subject is a table made out by Mr. J. G. Martin, of Boston, who gives the following as the amount that will be paid out in that city:

Bank dividends, $1,522,750; interest on city and United States bonds, $2,236,173; interest on railroad bonds, $6,509,574; interest on miscellaneous bonds, $568,933; railroad dividends, $1,026,282; miscellaneous dividends, $3,777,146; total, $15,640,858. This sum is supposed to be paid in Boston on stocks and bonds owned there. It seems not unreasonable to assume that the total paid out in the country will reach $125,000,000. Be the sum what it may it is large enough to make money easier, and time money is now loaning at 5½%, while money on call loans is down to 3%. Coincident with this there has been a stiffening of the rates for sterling exchange, although the demand for bills has not been great.

An improvement, too, has taken place in the stock market, and at present prices are uniformly higher than at the beginning of the week, but it is almost certain that the resignation of Mr. McLeod from the presidency of the Reading has had as much influence in producing this change as the easier rates for money.

The question that now presents itself is, How long will gold shipments last, and how much will be sent out?

If the outward movement should be of short duration and the amount shipped small, prices of stocks would undoubtedly advance. In any case it is the opinion of those best informed that they will not go lower.

At present there are several conditions which have affected and which will continue to affect the gold movement, though their influence is not easily measured. The most important of these is the World's Fair. It has recently become known that goods shipped to Chicago for exhibition has been entered as imports, which accounts, to a certain extent, for the unusual volume of our imports and the balance of trade against us. It is certain that a considerable amount of these exhibits will not be sold in this country.

This at once diminishes our adverse trade balance. Again it has been estimated that during recent years $100,000,000 has been spent abroad annually by traveling Americans. It is quite probable that during this year a large number of those who generally go abroad will stay at home to visit the fair. Again a large number of foreigners, generally estimated at 50,000, will visit this country. Altogether this change in passenger traffic will probably mean a saving of $100,000,000 to us. How soon these influences will be felt is not quite certain, but there is no doubt of their ultimate effect.

The Vienna correspondent of the London "Economist" writes as follows: The purchasing of gold for our currency reform is progressing favorably. The Rothschild syndicate has already bought the gold it requires for the 60,000,000 gold rents it has undertaken, and will now purchase 40,000,000 more. The syndicate buys privately, and does not have recourse to the gold stocks of the banks, so that while the 60,000,000 were being amassed the gold in the Bank of England and the Imperial Bank of Germany increased, and the stock of coin and bullion of the German Reichsbank now exceeds the circulation of notes by 48,000,000 marks. The report of the general meeting of the Austro-Hungarian Bank shows that from August 11th to November 17th, 1892, 40,329,000 florins gold were received, of which 17,000,000 were in bullion and more than 23,000,000 in coins, and of these 18,761,000 florins were American eagles, 1,917,000 florins in German imperial coins, 1,230,000 florins in sovereigns, 729,000 florins in 20 franc pieces, 434,000 florins in Japanese yens, and 246,000 florins in all kinds of coins. The reserve fund, which was 15,440,576 florins in securities that bear interest, was raised to 30,646,247 florins last year, because 13,525,166 florins, which are the profits of the bank's gold purchases made since 1872, were added to the reserve. The bank has thus had its means almost doubled, and at the same time the equilibrium in the finances of the State was re-established in both halves of the monarchy, though certainly at the price of high taxes and customs duties.

A despatch from St. Petersburg states that the coinage of silver roubles on private account has been suspended by the Russian Government.

The specie holdings of European banks at the beginning of April were as follows:

	March 30, 1893.		March 31, 1892.	
	Gold. £.	Silver. £.	Gold. £.	Silver. £.
England	26,234,386	.....	25,902,844	.....
France	66,403,305	50,981,536	56,284,000	50,952,000
Germany	34,728,750	11,576,250	35,340,000	11,780,000
Aust.-Hung'y	10,420,000	17,130,000	5,485,000	16,736,000
Netherlands	3,183,000	7,198,000	3,178,000	6,831,000
Nat. Belgium	3,052,667	1,526,333	2,865,333	1,432,667
Spain	7,713,000	4,712,000	7,256,000	4,451,000

Domestic and Foreign Coin.

The following are the latest market quotations for the leading foreign coins:

	Bid.	Asked.
Mexican dollars	$.65¼	$.66
Peruvian soles and Chilian pesos	.59¼	.60
Victoria sovereigns	4.86	4.88
Twenty francs	3.86	3.89
Twenty marks	4.74	4.78
Spanish 25 pesetas	4.80	4.85

Copper.—Decidedly lower prices have been established, and contrary to the general rule that at lower quotations more business is transacted in the present case it is almost the reverse. There are free sellers of first and second-hand lake copper at 11¼, but hardly any business can be recorded. Buyers claim that they have supplies sufficient to keep them going for some little time longer, and that they will not buy unless they can come in at still lower prices, and producers say that their stocks on hand are so small that they do not care to make further concessions. The opening of navigation from Lake Michigan is late this year, and it is doubtful if any copper forwarded via lake and rail will arrive here before the second or third week in May. However there appears to be copper enough until then, as most of the larger manufacturers are now using greater quantities of electrolytic copper. Several sales of lake copper are reported as having been made in Europe, but the prices are kept a secret.

Prices for casting copper have been reduced to 10¾@10⅞, and consumption in this grade of copper is quite satisfactory. Arizona copper is held for about 9¾.

The exports of copper during the last few weeks have been somewhat larger. The English market has been quiet, but steady, and quotations for G. M. B.'s have been ruling at £45 5s. for spot and £45 15s. for three months prompt. For refined and manufactured we quote: English Tough, £48@£48 5s.; Best Selected, £49@£49 5s.; Strong Sheets, £56 10s.@£57; India Sheets, £52 10s.@£53; Yellow Metal, 4¾d.@5d.

There has been quite a good demand abroad for best selected and electrolytic copper during the last few weeks.

The exports of copper from the port of New York during the past week were as follows:

	Copper Matte.	Lbs.	
To Liverpool—			
S. S. Nomadic	10,030 bags	1,081,300	$45,000
" Britannic	2,821 bags	270,978	11,500
" Saint Ronans	3,466 bags	495,271	22,000
To Havre--	Copper.	Lbs	
S. S. La Normandie	1,278 bars	448,159	$44,000
" Château Yquem	3 bars	263	29
" La Touraine	1 crate	720	85
To Bremen—	Copper.	Lbs.	
S. S. Trave	25 casks	22,400	$2,464
To Hamburg—	Copper.	Lbs.	
S. S. Essen	369 plates	44,896	$4,939
"	45 casks	56,250	67,700
To Rotterdam—	Copper.	Lbs.	
S. S. Rotterdamm	88 plates	11,246	$1,237

Tin has been very disappointing. The shipments from the East for the past three months have been very heavy but we understand that nearly all supplies have been drained. In any case these heavy shipments will prevent any great scarcity in Europe during the months of June, July and August. So far, the stocks accumulated here are not large, being only about 1,000 tons above the average stocks held in this country, and between now and the end of June, heavy quantities will have to be imported in order to escape the duty for the remainder of the year. The market has been rather dull, and a few isolated contracts have been made at 20¾c. for spot and April delivery, but now the price is 20½c. for spot, 20¾c. for May, and 20·80c. for June.

London, after the Easter holidays, opened at a decline of £1, spot tin selling at £93 15s., and with the exception of a few small variations, this price has not changed.

Lead is again higher, and prices have advanced to 4·10 and 4⅛, with remarkably few sellers. Consumption at this time of the year is very good, and Western smelters complain about the scarcity of ores, and a consequent falling off of production.

In England, the market is a trifle easier, Spanish lead being quoted at £9 15s., and English lead at £9 17s. 6d.

Chicago Lead Market.—The Post, Boynton, Strong Company telegraph us as follows: The market has been firm. Some holders are offering lead in a limited way at 3·90c., but the business doing as yet has been light, as consumers hesitate before paying the advanced price.

St. Louis Lead Market.—The John Wahl Commission Company telegraph us as follows: Lead gradually advancing and demand fairly active; latest sales are at 3·85c. As the prices go higher buyers become more friendly toward the metal.

Spelter.—The trifling higher prices which have been asked have put a stop to actual business, and we have still to quote spelter at $4.30, delivered, New York, but the market is entirely nominal thereat. In London good ordinaries are quoted at £17 11s. 3d.; specials, £17 13s. 9d.

Antimony remains lifeless, and we have to quote Cookson's at 10¾@10⅞; L. X., 10¼@10⅜, and Hallett's 10@10⅛.

Nickel.—No business has been recorded.

Quicksilver.—This market continues steady and unchanged as to prices. Quotations are: New York, $38.50; London, £6 10s.

IRON MARKET REVIEW.

NEW YORK, Friday Evening, April 7, 1893.

Pig Iron Production During Weeks Ending April 7th, 1892, and April 7th, 1893, and During Both Years to These Dates.

Fuel used.	Week ending April 7, 1892		Week ending April 7, 1893.		From Jan., '92	From Jan., '93.
Anthracite.	94	38,970	72	34,310	506,610	432,750
Coke.	164	138,990	146	134,595	1,806,870	1,725,775
Charcoal	55	11,820	36	8,623	120,709	114,315
Totals	313	189,780	255	177,528	2,434,189	2,272,840

Northern brands: No. 1, $14 50@$15.25; No. 2, $13.75@$14.50; Gray Forge, $12.75@$13.50. Southern: No. 1, $14.25@$14.75; No. 2 F. and No. 1 soft, $13.25@$13.75; Gray Forge, $12 25@$12 50, tidewater. Scotch irons: Coltness, $21.50@$22; Eglinton, $19.50@$20.

Billets and Rods.—Steel billets, tidewater, $25@$25 25; foreign, $29@$29.50; wire rods, $32.50@$32.75; foreign, $40@$40.50; Swedish, $52.50@$53.

Manufactured Iron and Steel.—Angles, 1·8@2c.; axles, scrap, 1·90@2·10., delivered; steel, 1·85@2c.; bars, common, 1·55@1·60c.; refined, 1·65@1·9c. on dock; beams, up to 15 in., 2@2·15c.; 20 in., 2·35@2·4c.; car truck channels, 2@2·10c.; channels, 2·10@2·20c., on dock; hoops, steel, 1·8@1·9c., delivered; links and pins, 1·85@2·10c.; plates, bridge, 2@2·10c.; fire-box, 2·5@2·8c.; flange, 2·25@2·50c.; marine, 2·50@2·75c.; sheared, 1·55@2·10c.; shell, 2·10@2·25c.; tank, 1·8@2c.; universal mill, 1·85@1·90c.; tees, 2·30@2·60c., all on dock.

Merchant Steel.—The advancing tendency of steel billets at Pittsburg will, if it continues, stiffen price on merchant steels and further stimulate the implement trade to place their orders early, inquiry for which is already fair. Tool steel is becoming more active. Quotations are: Tool steel, $6.50@$6.75 and upward; tire steel, $2@$2.10; toe calk, $2.30@$2.40. Bessemer machinery, $2.10@$2.20. Bessemer bars, $1.70@$1.75; open hearth machinery, $2.30@$2.40; open hearth carriage spring, $2.10@$2.20; crucible spring, $3.75@$4.

Old Material.—Rails, iron, $16.50@$17; steel, $13@$13.50; No. 1 scrap, $15.75@$16; car wheels $12.50@$13, f. o. b. Jersey City.

Rail Fastenings.—Fish and angle plates, 1·55@1·60c. at mill; spikes, 1·9@1·95c.; bolts and square nuts, 2·45@2·50c.; hexagonal nuts, 2·55@2·60c. delivered.

Spiegeleisen and Ferromanganese.—Spiegel, $25.25@$25.50; Ferro, $56.50@$57.

Steel Rails.—$29 mill or tidewater. Girder rails, $32.50@$33.

Buffalo. April 6.

(Special Report from Rogers, Brown & Co.)

No new features have developed in the market during the past week. Consumption is very heavy, but competition is remarkably keen with both sellers and purchasers.

In order to get business, the necessity for low prices with melters of pig iron has become so pronounced that the influence of it through buyers had a tendency to stifle any advance, however slight, unless it should be founded on the only sure basis of such an advance—the excess of consumption over production.

We quote on the cash basis f. o. b. cars Buffalo: No. 1 X foundry strong coke iron, Lake Superior ore, $14.50; No. 2 X foundry strong coke iron, Lake Superior ore, $13.75; Ohio strong softener No. 1, $14.50; No. 2, $14; Jackson County silvery No. 1, $17@$17.30; No. 2, $16.30@$16.80; Lake Superior charcoal, $17.25; Tennessee charcoal, $18; Southern soft No. 1, $14; Alabama car wheel, $19; Hanging Rock charcoal, $20.50.

Chicago. April 6.

(From our Special Correspondent.)

The crude iron market here continues to show the same general feeling of confidence so far as regards Northern coke and Lake Superior charcoal iron. While the consumption of coke iron in this territory is showing a large percentage of increase over the corresponding month of the previous year, charcoal iron, on the contrary, apparently shows a decrease. This at first glance appears strange in the face of the large decrease in iron consumption, but when looked into carefully it is seen that the better grades of coke iron are being used as a substitute for charcoal iron, either in whole or in part, depending upon the character of the work. In nearly every instance the substitution of good coke iron has been attended with results entirely satisfactory to the founder and a distinct saving in the case of his mixture. It is undoubtedly true that Northern coke irons have steadily improved in quality during the past few years, and many brands of charcoal irons have been so weakened by the constant crowding of the furnaces to bring up the tonnage and lower the cost that there is little or no difference in strength between the two. Finished iron and steel, with but few exceptions, are rather quiet, and small orders are the rule. Old material of all descriptions is very dull, and prices largely nominal.

Pig Iron.—The volume of business is of moderate proportions for Northern coke iron at steady prices. The slight advance recently made in the better grades of local coke iron are well maintained, and consumers have bought rather freely in lots of 50 to several hundred tons, and in several instances 1,000 tons for scattered deliveries through the year. Inquiry is rather quiet, but the situation is fully as promising as it has been during the past month, though the weaker feeling in Southern iron is not without its effect. There is no change in Southern coke iron, demand light and prices, while not quotably lower, are easy. The outlook for the next two or three weeks is not flattering, but concessions from current rates would enable furnace agents to book a considerable tonnage of metal. Lake charcoal iron is still quiet, but increased activity is looked for by end of month.

Quotations per gross ton f. o. b. Chicago are: Lake Superior charcoal, $16.50@$17.25; Lake Superior coke, No. 1, $13.75@$14.00; No. 2, $13.25@$13.50. No. 3, $12.75@$13; Lake Superior Bessemer, $14.75; Lake Superior Scotch, $14.50@$15; American Scotch, $16 00@$16.50; Southern coke, foundry, No. 1, $14.25; No. 2, $13.10; No. 3, $12.50; Southern coke soft, No. 1, $13.10; No. 2, $12.75; Ohio silveries, No. 1, $16.50; No. 2, $16.00; Ohio strong softeners, No. 1, $16.75; No. 2, $16.25; Tennessee charcoal, No. 1, $17; No. 2, $16.50; Southern standard car wheel, $19.50@$20.

Steel Billets and Rods.—Billets so far remain unchanged in this market at $25. Rods are nominal at $32.50.

Structural Iron and Steel.—Inquiry and demand are less active generally. Construction plans are out for the Stock Exchange Building, and figures are now being made by contractors. Quotations, car lots, f. o. b. Chicago, are as follows: Angles, $1.85@$1.90; tees, $2.15@$2.25; universal plates, $1.90@$1.95; sheared plates, $1.90@$1.95; beams and channels, $1.95@$2.25.

Plates.—Agents note a good trade in small lots in store, but without improvement in prices. Mill orders are very scarce. Steel sheets, 10 to 14, $2.30@$2.40; iron sheets, 10 to 14, $2.20@$2.30; tank steel, $1.90@$2; shell iron or steel, $2.50@$2.75; firebox steel, $4.25@$5.25; flange steel, $2.75@$3; boiler rivets, $4@$4.15; boiler tubes, all sizes, 60%.

Merchant Steel.—Inquiry from the implement trade is steadily growing, and some large contracts will be given out this month for special shapes of mild steels. Quotations are: Tool steel, $6 50@$6.75 and upward; tire steel, $2@$2.10; toe calk, $2.30@$2.40. Bessemer machinery, $2.10@$2.20. Bessemer bars, $1.70@$1.75; open hearth machinery, $2.30@$2.40; open hearth carriage spring, $2.10@2.20; crucible spring, $3.75@$4.

Galvanized Sheet Iron.—If the present demand is maintained an advance is assured, as mills are much behind on orders. Discounts are very firm at 70 and 10% off on Juniata and 70 and 15% off on charcoal, and jobbing quantities at 70 and 5% off on the former and 70 and 10% off on the latter.

Black Sheet Iron.—Jobbers and large dealers are contracting earlier this year than usual, and light sheets are very active at 2·85c. for No. 27, common Chicago. Jobbers quote 3·10c. for iron and 3·10@3·15c. for steel, same gauge.

Bar Iron.—Several large season's contracts have been placed, and the inquiry from the agricultural implement makers is decidedly active. A very fair amount of business is being placed for early delivery. Quotations f. o. b. Chicago, 1·55@1·58c., carrying at 13c. freight rate. Trade from agents' warehouses is good at 1·70@1·80c. on iron or steel in less than car loads.

Steel Rails.—Demand is still inactive for anything but small lots, but the mills here are looking for a little inquiry during early summer. Quotations are $30@$31.50 according to quantity. Quotations on iron and steel splice bars are 1·60@1·65c.; track bolts, square nuts, 2·55c.; hexagon, 2·65c.; spikes, 2·05@2·10c. according to style.

Nails.—The advance of 2½c. per keg last week has affected demand from mill, which is now much quieter. Agents now quote $1.67½ base Chicago, and jobbing price is $1.75 from stock. Steel cut nails are in moderate demand from mill at $1.40 base and $1.50 from store.

Scrap.—Business is very dull, dealers buying very sparingly, and offerings from railroads are large. Quotations are nominal: Railroad, $15; No. 1 forge, $14; No. 1 mill, $9.50; fish plates, $15.50; axles, $18.50; horseshoes, $15; pipes and flues, $7; cast borings, $5.50; wrought turnings, $8; axle turnings, $9.50; machinery castings, $10; stove plates, $6.50; mixed steel, $10.; coil steel, $15; leaf steel, $15.50; tires, $14.50.

Old Material.—Iron rails are nominally quoted at $18, consumers offer $17.75, and as there is no pressure to sell, business is at a standstill. Steel rails are in moderate demand at $11@$14.50; a few hundred tons of selected sold at the latter price. Car loads are quiet at $14.50@$14.75.

Louisville. April 1.

(Special Report by Hall, Bros. & Co.)

Much the same conditions prevail in iron circles that have ruled for several weeks past. The demand is only fair and prices vary about as usual. There is no quotable change in figures, and we, therefore, make no alterations.

Hot Blast Foundry Irons.—Southern coke No. 1, $13@$13.25; Southern coke No. 2, $12@$12.25; Southern coke No 3, $11.25@$11.50; Southern charcoal No. 1, $15.50@$16; Southern charcoal No. 2, $15@$15.50.

Forge Irons.—Neutral coke, $10.75@$11; mottled, $10.50@$10.75.

Car Wheel and Malleable Irons.—Southern (standard brands), $17.50@$18.50; Southern (other brands), $16.50@$17; Lake Superior, $18@$18.50.

Pittsburg. April 6.

(From our Special Correspondent.)

Raw Iron and Steel.—Business in leading descriptions was reasonably maintained. The fact is very evident that the daily consumption of the raw material is such that consumers are kept busy obtaining the material required to keep their works running. The market shows a fair degree of steadiness. There is a good deal of business doing, but in proportion to the capacity for production there is barely enough to go around, hence the continuance of low prices. The change to more seasonable weather, however, and the better feeling in financial circles ought to help business.

The great want is better prices, but on this point there is less confidence than in regard to the volume of business. When mills and foundries are as well employed as they are to-day and prices refuse to advance, there is not much hope that they will do so until some radical change in the situation is developed. The ore situation may decide to some extent the question.

Pig iron prices are steady, and with light supplies both in first and second hands sellers are inclined to show increased firmness, but that is about all that can be claimed. Southern irons are too plenty to permit of any material advance in prices.

This, as every one in the trade knows, is largely because of the substitution of steel, a large proportion of which has been supplied from Pittsburg and Wheeling. This cuts off the consumption of ordinary mill irons, while the foundry trade is sharply competed for by Southern furnaces, so that the only chance for the existence of local furnaces is in low prices.

The prospect is not cheering, but if iron can be made at $8 to $9 in the South, $12 to $12.50 is about what it will have to be made for in Pennsylvania if the furnaces intend to maintain their business position. As many of the producers of standard grades have orders on hand for some weeks ahead, and as there appears to be no disposition on the part of other furnaces to force sales by concessions, the market is fairly steady, although the future remains uncertain. Stocks of iron in first and second hands are comparatively small, but there is plenty of good material to meet the demand of buyers who continue in a majority of instances to restrict their purchases as much as possible. The following sales will show the value of raw iron:

Tons.	Cash.
Coke Smelted Lake and Native Ore.	
3,000 B., April, May..	$14.00
2,500 B., April	14.15
2,000 B., April, May..	14.00
2 000 B., April, May ..	14.00
2,000 B., April.	14.25
1,200 G. F.....	12 25
1,000 G. F.....	12 25
1,000 B.....	14.10
1,000 B.....	14.00
1,000 B.....	14.00
500 B.....	14.25
500 G. F.....	12 25
500 G. F..	12.25
500 G. F.....	12.25
200 No. 1 F.....	14 00
200 No. 2 F.....	13.00
150 S. No. 1.....	16.00
150 S. No. 2.....	15.00
100 No. 3 F.....	13.00
Charcoal.	
100 C. B	26.50
100 C. B.....	26.00
100 No. 2 F.....	18.90
50 No. 3 F	18.50
50 No. 1 F.....	20.00
Steel Billets and Slabs.	
2,000 B., April, May, June, at mill.....	$22.75
2,000 B., May, June, at mill.....	22.80
1,000 B. and S., April, May.....	23.25
1,000 B., delivered prompt.....	23.50
1,000 B., April, May, June, at mill.....	23.00
200 B., at mill.....	23.25
Muck Bar.	
2,000 N.....	24.25
1,000 N.....	24.50
1,000 N.....	24.40
500 N., April, May...	24.50
Skelp Iron.	
700 W. G..... 1.52	4 m.
500 N. G 1.52½	4 m.
400 S..... .. 1.72½	4 m.
Skelp Steel.	
500 W. G..... 1.55	4 m.
Ferro-Manganese.	
160 80% del.....	59.75
160 80% dom.....	59.00
Blooms, Billets and Bar Ends.	
1,000 B. and B. ends...	15 25
350 Bloom ends.....	15.50
Spelter.	
200 Spelter.....	4 17
Sheet Bars.	
450 S. B., at mill.....	29.00
Old Iron and Steel Rails.	
1,500 S., long pieces...	15.75
1,000 S., long pieces..	15.50
1,000 Am. T's, Youngstown.....	19.75
300 Am. T's.....	20.00
Scrap Material.	
250 No. 1 R. R. W. S., net.....	15.50
250 C. S., gross.....	11.50
200 C. B., gross.....	7.75
100 B. C. W., gross..	16.00

Philadelphia. April 7.

(From our Special Correspondent.)

Pig Iron.—The market has shown no decided weakness or developed any particular strength. Standard brands are firmer, however, but prices for these irons are still very close to the cost line. The prospect for pig metal is not encouraging, as the unsettled condition of both foreign and lake ores serve only to create a halting policy and render the trade dull and almost featureless. No. 1 foundry is $15@$15.25 per standard, and for No. 2 $13.50@$14 50, according to make; Forge irons are $12.50@$13.25; Bessemer, $15.50 at furnace.

Muck Bars.—The market for muck bars has almost closed, as sales are very limited and prices are lower than they have ever been. A few small lots were sold the last week at $23.50, and commissions are even offered below that figure.

Steel Billets.—There has been considerable inquiry for billets the past week, with a number of fair sales. Makers are well supplied wi h orders and the market seems to be looking up. Quotations $25@$25.50 delivered at this point.

Merchant Iron.—Although the market is not a favorable one for producers, the mills keep well employed, and prices are firm at old figures. A few more sunny days will serve to create a more active business, however.

Nails.—An agreement has been made between manufacturers that will serve to reduce production and increase prices as well. The various mills are to be reduced to a certain allotment, those that produce beyond that amount will be relieved of the surplus stock by the association and a penalty is prescribed for those who violate the agreement. Wire nails have advanced 15c. per keg and are now quoted at $1.75, cut nails $1.50.

Skelp.—Considerable more activity prevails in both sheared and ground skelp.

Wrought Iron Pipe.—The market is fairly active for small sizes; outside of that the demand is limited.

Sheet Iron.—Contrary to expectations the stiffening of the prices of billets has had no effect on the price of steel sheets. Best refined $2.75@$3.50. Best soft steel 2¾@4c.

Plate and Tank.—An improvement in the demand has set in, but prices are low. The mills are well employed, and as the season advances increased activity is looked for, and firmer if not higher prices as well. Tank plates $1.80; shell $2.10; flange $2.40 for steel.

Structural Material.—Although there is but a fair business doing, the outlook is becoming much brighter. Some good sized work is in sight, which will materialize in the course of a few weeks. Prices keep very near the cost line and concessions about as marked as ever.

Steel Rails.—There is a fair amount of business doing in heavy girder rails for street railroads. Quotations $29 at Eastern mill.

COAL TRADE REVIEW.

NEW YORK, Friday Evening, April 7.

Statement of shipments of anthracite coal (approximated), for week ending March 25th, 1893, compared with the corresponding period last year:

Regions.	March 25, 1893. Tons.	March 26, 1892. Tons.	Difference.
Wyoming Region.....	494,667	360,346	Inc. 134,321
Lehigh Region.....	149,339	80,042	Inc. 69,297
Schuylkill region.....	251,440	194,080	Inc. 57,296
Total.....	895,446	634,468	Inc. 260,978
Total for year to date....	9,193,143	8,563,595	Inc. 629,548

Statement of shipments of anthracite coal (approximated) for week ending April 1st, 1893, compared with the corresponding period last year:

	April 1, 1893. Tons.	April 2, 1892. Tons.	Difference.
Wyoming region.....	444,428	373,553	Inc. 70,875
Lehigh region.....	117,149	114,908	Inc. 2,241
Schuylkill region.....	246,761	226,017	Inc. 20,744
Total.....	808,338	714,478	Inc. 93,860
Total for year to date.	10,001,481	9,278,073	Inc. 723,408

PRODUCTION OF BITUMINOUS COAL for week ending April 1st and year from January 1st:

EASTERN AND NORTHERN SHIPMENTS.

	1893. Week.	1893. Year.	1892. Year.
Phila. & Erie R. R.....	1 679	35,373	24,253
Cumberland, Md.....	84,367	902,485	831,254
Barclay, Pa.....	1,029	18,978	52,582
Broad Top, Pa.....	16,731	211,318	150,550
Clearfield, Pa.....	91,762	1,047,555	924,891
Allegheny, Pa.....	30,871	322,263	288,064
Beach Creek, Pa.....	31,763	5? 2,675	578,120
Pocahontas Flat Top.....	63,762	675,?95	622,771
Kanawha, W. Va.....	69,321	528,830	617,838
Total.....	388,385	4,545,012	4,090,323

WESTERN SHIPMENTS.

	1893. Week.	1893. Year.	1892. Year.
Pittsburg, Pa.....	26,039	332,833	331,777
Westmoreland, Pa.....	43,599	530,354	465,507
Monongahela, Pa.....	8,840	183,527	114,627
Totals.....	78,478	1,046,714	911,911
Grand totals.....	466,863	5,591,726	5,002,234

PRODUCTION OF COKE on line of Pennsylvania R. R. for the week ending April 1st, 1893, and year from January 1st, in tons of 2,000 lbs.: Week, 109,670 tons; year 1,444,558 tons; to corresponding date in 1892, 1,502,730 tons.

Anthracite.

The most important event of the week is the resignation of Mr. McLeod from the Presidency of the Reading, as also from the Receivership, to take effect May 1st. This was a sensible thing for him to do, seeing that he had brought the Reading into its present troubles, and was hampering the negotiations for providing means to tide over the crisis. In his letter of resignation he stated the matter very fairly in saying that the rehabilitation of the Reading was rendered more and more difficult by his continnance in the Presidency.

It seems to be generally held that under his rule Reading affairs have not prospered, and that the adoption and prosecution of his policy have brought the company to the verge of ruin. Of course the Philadelphia stockholder is full of praise for Mr. McLeod, declaring in the most theatrical manner that "his retirement is accompanied by no element that will injure his fame, and when tho record is read in aftertime it will be plain to all men that Archibald Angus McLeod did more to lift the Reading into a first place among the great corporations of the world than anybody that went before or is likely to come after him."

This is nonsense. With Mr. McLeod as a man we have nothing to do in these columns, but with Mr. McLeod as the representative of one of the most oppressive combinations of recent years we have a great deal to do. He has brought the Reading to this pass, that it stands before the public as hostile to every ton of anthracite coal that is not mined, hauled and shipped with its permission. If the retirement of Mr. McLeod is not to be followed by the abandonment of the McLeod policy we may be prepared to see a repetition of the events of the past few weeks whenever his successor attempts to put in practice the vicious theories of coal monopoly that have lately characterized the Reading management. Unjust discrimination against independent operators, and an unholy desire to crush out all opposition, are as offensive to every fair-minded man as any piece of despotism can be, no matter whether a McLeod or a McDougal or a McAnybody be at the head of it. We do not want a scapegoat; it is the wrong itself we attack.

Reading matters have not changed since last week, except in so far as Mr. McLeod's resignation has affected them. There is a report that the sales agents have determined upon an advance of 25 cents on the 1st of June, September and October for

stove and chestnut, but it lacks confirmation. It is too early yet to say what prices will rule in the summer and fall, but we are inclined to believe that they will not be *lower* than at present.

Based on the price coal has brought at the mines during the past month, which is $2.58.2, the Schuylkill Coal Exchange has fixed the rates of miners' wages and mine laborers at 3% above the $2.50 basis for the last half of March and the first half of April, a reduction of 2% on the previous month.

During March the average price of coal in Schuylkill County was $2.58, as against $2.29 in March, 1892, and $2.22 in March 1891. The average price in February of this year was $2.64. The new rates from the Schuylkill are $1.70 for prepared sizes, $1.40 for pea, and $1.25 for buckwheat.

The coal shipments of the Reading system for the week ending April 1st were 400,000 tons, of which 45,000 tons were for Port Richmond and 55,000 for New York waters. This makes the total shipments by the Reading, since January 1st, 7,718,848 tons.

Shipments from the various regions for the week ending March 25th, 1893, and March 26th, 1892, were as follows:

	March 25, 1893.	March 26, 1892.
Lehigh	143,339	80,042
Schuylkill	251,440	194,080
Wyoming	494,667	360,346
	895,446	634,468
Year to date	9,193,143	8,563,595

The division of the traffic has not yet been satisfactorily adjusted. For instance, the question of the percentage of the Delaware & Hudson is to be settled. Last year Delaware & Hudson coal that went over the Pennsylvania was not included in its pro rata, and this year it is said that such coal is to be included. This will give rise to questions of division among the other roads. The Delaware, Lackawanna & Western, which is said to have exceeded its pro rata last year, is to be given 16% of the total output controlled by the combine. It is understood that this company exceeded its pro rata last year by some 300,000 tons. Under the new agreement its usual 16% rate will be inclusive of the coal of independent operators. The allotment to the Reading has not yet been made, but under such conditions as are likely to maintain, it can hardly be less than that of last year, and may be more.

Jersey Central should be given enough to counterbalance its loss of 500,000 tons last year, but whether the sympathy openly expressed for this road will take the form of increased allotment is as yet undecided. The rates for boats making the trip from Rondout to Honesdale, on the Delaware & Hudson Canal, and returning with coal will be 70c. per gross ton. From Rondout to New York the rate will be 17c. per gross ton. It is said also that an installment of $15 will be required towards the payment of the boat, and that $7 and a fraction will be reserved out of the freight of each trip until the close of the season between Rondout and Honesdale, and $5 between Rondout and New York.

Prices are as follows:

Philadelphia.

	Broken.	Egg.	Stove.	Chestnut.
Hard white ash	$3.75	$3.75	$3.90	$3.90
Free white ash	3.65	3.65	3.90	3.90
Shamokin	...	3.90	4.10	3.90
Schuylkill R. A	....	4.00	4.25	4.00
Lykens Valley	4.50	5.25	5.50	4.75

New York.

	Broken.	Egg.	Stove.	Chestnut.
Hard white ash	$4.00	$4.00	$4.15	$4.15
Free white ash	3.90	3.90	4.15	4.15
Shamokin	....	4.15	4.35	4.15
Schuylkill	....	4.25	4.50	4.30
Lykens Valley	4.75	5.50	5.75	5.00

Bituminous.

Less than one-half of the contracts usually made by the end of the first week in April have been closed, and maximum prices have ruled. For best grades the prices have been: New York, $3.35; Philadelphia, $2.60; Baltimore, $2.50. It is reported that a contract for some 80,000 tons was taken at $2.70 on dock in cars, Brooklyn, but this figure is evidently suspicious.

The freight rate on this particular coal is $2.25, and it costs at least 45 cents per ton to put the coal on cars at the mines. It is not likely that anything like $2.70 is the correct quotation, for $3 would be low enough.

Cars are moving to better advantage than was the case a week or ten days ago, but there is room for improvement yet, and it is on the ground floor and easily accessible.

At the special meeting of the directors of the Huntingdon & Broad Top Mountain Railroad the negotiations with the George's Creek & Cumberland company were concluded and the proposed contract ratified. Under the terms of the contract the Broad Top will have 500 coal cars built for the exclusive use of the George's Creek company. The cars will be used to transport bituminous coal from the Cumberland region over the Broad Top line by way of the Pennsylvania Railroad Bedford Division. The increased shipments under the terms of the agreement, it is understood, will amount to about 300,000 tons per annum. The Huntingdon & Broad Top Railroad Company reports an increase in coal transported over its road for the week ending March 11, 1893, as compared with the corresponding week of 1892, of 18,270 tons, and for the year to date an increase of 91,310 tons.

There is nothing further from Ignatius Donnelly and the Minnesota coal combine. Rochester, however, now contributes its share of indictments for conspiracy.

In the Court of Oyer and Terminer, April 3, Justice Adams took up the case of the members of the Rochester Coal Exchange indicted for conspiracy. Eighteen of the leading dealers of the city are named in the indictment, among the number being Arthur G. Yates, president of the Buffalo, Rochester & Pittsburg Railroad Company. Only seven of the indicted dealers are to be tried at present, however. They are Henry A. Schlick, George Engert, Henry F. Drake, Charles H. Babcock, Charles Bradshaw, W. C. Dickinson and Charles A. Phillips. William A. Sutherland, who was the Republican candidate for Attorney-General in 1891, is assisting District Attorney Forsyth in the prosecution, and ex-Senator George Raines and Martin W. Cook are the defendants' counsel. It was late in the afternoon before a jury was secured. District-Attorney Forsyth occupied an hour in his opening. He said that the prosecution would prove that the dealers had conspired to prevent free competition, to raise the price of coal and to prevent any cutting of the fixed rates. He charged that a city contract which was awarded to a dealer named Daniel H. Burns at $4.95 a ton, the members of the exchange bidding $5, had been annulled because the exchange prevented Burns purchasing coal to fill the contract. W. C. Dickinson, an exchange dealer, then received the contract, thus compelling the city to expend $5,000 more than under the Burns contract. It is charged that Dickinson for this contract paid the exchange $2,250. The exchange, it is alleged, also assessed H. F. Drake $600 on the Poor Department contract. The prosecution also alleges that members of the exchange who sold coal below the fixed rates were fined from $70 to $100 each by the exchange for the offense. In the trial, J. Harry Stedman, the reputed secretary of the Coal Exchange, declined to answer almost every question put by the prosecution, on the ground that he would thereby incriminate himself. The most important testimony of the day was that of Charles Pasch, the son of August Pasch, a coal dealer, who represented his father at the meeting of the exchange. He testified concerning the manner in which the exchange fixed the price of coal each month, told how his father was fined $70 by the organization in punishment for selling a ton of coal at a price below that fixed by the exchange. The prosecution has 40 witnesses to call, and as the defense has about half as many it is likely that the trial will occupy two weeks.

Prices in New York Harbor are from $3.10 to $3.15, and at lower tidewater ports $2.50 to $2.60.

Charter rates are: New York to Rhode Island, 65 to 75 cents; to Bostor, 75 to 90 cents. Philadelphia to Sound ports, $1.10 to $1.15; to Boston, $1.15; to Portsmouth, $1.25. Baltimore to Sound ports, $1.10 to $1.15; to Boston, $1.20 to $1.25.

Boston. April 7.

(From our Special Correspondent.)

This has been an uneventful week in the anthracite coal trade. Dealers generally throughout New England are pursuing the hold-off policy, expecting to get coal at lower rates ere long. It is anticipated that the first reduction will come in freight rates, and then there is a hope that the producing companies will reduce their prices.

This seems to be the feeling generally and until it changes producing companies cannot expect much business from this section. Prices, of course, are unchanged.

Prices quoted here, net New York, on free burning coal: Stove, $4.15; egg, $3.90; free broken, $3.90; chestnut, $4.15; Lykens Valley (at Philadelphia): broken, $4.85; egg, $5.45; stove, $6; chestnut, $5.

In bituminous coal the closing of contracts seems to be at a standstill. Most of the contracts that we have noted of late were for New River and Pocahontas coals. It is understood that the George's Creek Cumberland people are sticking to their opening prices: $2.40 to dealers and $2.50 to consumers. The sellers of this coal urge that the railroads will maintain prices, as the conditions are very favorable for them to do so, as the World's Fair business will undoubtedly be heavy this year and the transportation of coal in the height of the season is apt to be a matter of minor consideration. None of the railroads have closed so far as I can learn. They are holding off in hopes that they secure $2 coal as last year.

Spot coal is active and firm. George's Creek is worth $4@$4.05 per ton on cars here, and Clearfield $3.75.

Freights continue high and firm. They are: From New York, 75@80c.; from Philadelphia, $1@$1.10; from Baltimore, $1.25; from Newport News and Norfolk, $1@$1.10.

The retail trade is of very fair proportions, but yardmen think it is not to last long. Prices are strongly maintained and the yards are all running with light stocks.

Retail prices are: Stove, $6.50; nut, $6.50; egg, $6.25; furnace, $6; Franklin, $7.75; Lehigh egg, $6.50; Lehigh furnace, $6.25; soft coal, $4.25@$5.

The receipts of coal at the port of Boston for the week ending April 1 were 53,863 tons of anthracite and 21,275 tons of bituminous against 53,183 tons of anthracite and 14,198 tons of bituminous for the corresponding week last year. Since January 1st the receipts have been 318,890 tons of anthracite and 235,139 tons of bituminous, against 398,083 tons of anthracite and 139,268 tons of bituminous for the corresponding time last year. The receipts from the provinces thus far this year have been 2,980 tons of bituminous. These figures are of interest since the Whitney syndicate of Boston bought the Nova Scotia coal mines with the purpose of developing them.

Buffalo. April 6.

(From our Special Correspondent.)

The general trade in coal, both bituminous and anthracite, is quiet and at unchanged quotations. The weather is springlike now, so that less fuel is now being consumed in households. Vessels are not moving yet, so that source of consumption has not commenced, but the steam craft that are ready to start have their fuel on board.

Several coal charters have been made at 60c. per net ton free on and off, Buffalo to Chicago and Milwaukee, and the vessels are now at the chutes loading. The opening rate for 1892 was 40c. per net ton. It is expected that the quantity of coal to be moved this year will be largely in excess of any previous year's record. When navigation opens it will, doubtless, come with a rush, for near 10,000,000 bushels of grain are already loaded at Upper Lake ports for Buffalo. Canalmen are actively engaged in preparing their boats and have confidence that a good season's business at remunerative prices will be done.

The prospects of the opening of the Straits and the St. Marie river at an early day is very dubious, from all accounts received, unless some extraordinarily warm weather sets in. May 1st is considered to be about the date that the first vessel will pass through the Straits of Mackinaw.

The estimated carrying capacity of the vessels on the lakes is 1,400,000 tons, 75,000 tons of which were added in 1892, deducting losses by wrecks, fire, etc.

The aldermen of our city have agreed to grant the South Buffalo Natural Gas Company the privilege of laying their mains in that district if they will not charge more than 25 cents per 1,000 cu. ft., and not use the gas for illuminating purposes. After July 1st, 1893, the present gas companies of this city will furnish lighting gas at $1.10 per 1,000 cu. ft., and after July 1st, 1894, at $1 per 1,000 cu. ft.

The Canadian government has refused to make a grant of $1,000,000 for the preliminary survey of the proposed canal across Canadian territory from Lake St. Clair to Lake Erie.

Chicago. April 6.

(From our Special Correspondent.)

The news of the resignation of President and Receiver McLeod of the Philadelphia & Reading created little surprise in coal circles here, as it was generally believed that some such change would have to be made.

The anthracite coal trade is very quiet, and for current month will be merely a weather trade. Stocks are well cleaned up and it is doubtful if there is over 250,000 tons on dock and large yards. The present lull is being utilized by some of the shippers in estimating the amount of their requirements for the incoming season. It is generally anticipated that the needs for the season of 1893-4 will be considerably in excess of the one just closed. Already some of the individual shippers are receiving large quantities of all-rail coal, which is going into stock, and this action, on their part, is on account of the expected heavy passenger traffic interfering with freight business during the coming summer. The policy of not making opening spring circular prices is causing a good deal of comment. Retail trade is very light and for small quantities to piece out the season.

Bituminous coal continues in excessive supply, and prices are badly demoralized. Sellers are more plentiful than buyers, and the former are offering extraordinary inducements on the "spot" article. The strike troubles which are expected in Ohio, Indiana and Illinois are causing considerable uneasiness among shippers, and as both sides are determined, the one to demand an advance on present price of digging coal, and the other to refuse any concessions, the other coal carrying roads—Illinois Central, Chicago & Alton, Wabash, Erie and others—will follow the example set them by the Chicago & Eastern Illinois, and advance freight rates on May 1st. This is a factor that will have to be taken into consideration by shippers and dealers in making contracts for the year. This advance in freight will also be urged by operators against any higher price for mining coal.

Coke is in moderate demand, and there is a surplus of all grades. Prices are easy, and it is hard to move, as foundries are well supplied.

Quotations are: $4.65 furnace; $5.05 foundry, crushed; $5.40 Connellsville; West Virginia: $3.90 furnace, $4.10 foundry; New River Foundry, $4.65; Walston: $4.65 furnace, $5 foundry.

Pittsburg. April 6.

(From our Special Correspondent.)

Coal.—The strike along the Monongahela Valley being ended, work has been resumed all along the line. The miners for a week or ten days will not be able to mine as much coal daily as they were doing at the time they quit; it will require time to harden their hands and get into proper shape. Coal as fast as mined is being towed to the Pittsburg harbor for shipment to the lower markets. A rise in the Allegheny enabled coal men to ship 1,250,000 bushels, all that was loaded.

The railroad miners are now discussing the question of rates in their districts. Shipments from these mines are still being retarded by an insufficient

supply of cars. An investment in Washington county farms by Philadelphia parties has been completed and arrangements made for opening a large coal field in Peters township, about 15 miles from Pittsburg. The deal was closed for 1,000 acres. A block of 10 farms near the Allegheny county line has been secured, the first installment of the purchase money having been paid down, and work, it is said, will be commenced at once. A new railroad will be built to connect with the Baltimore & Ohio, striking that line at Snowden.

Connellsville Coke.—But few changes have been made in this region since our last. Thirty idle ovens have been fired at the Donnelly works of the McClure Coke Company, 20 at Youngstown, 30 at Kyle; total, 80.

The car supply is improving slowly, and the operators are trying to keep down production to meet the supply of cars assigned them.

Regarding the price of furnace coke, there is a variety of opinions even among operators themselves. It is asserted that furnace coke has recently been sold as low as $1.50 and even $1.40 per ton, but the large operators protest that they are selling none at such prices, and it is not likely that there is much selling under $1.65@$1.75 per ton. Foundry and crushed coke sell up to the quotations.

The detailed report of the operation and output of the region shows 12,932 ovens in blast and 4,395 idle, with an estimated production of 125,820 tons, a decrease for the week of 734 tons. This week's shipments aggregated 133,551 tons, distributed as follows: To Pittsburg, 1,784 cars; to points east of Pittsburg, 1,700 cars; to points west of Pittsburg, 3,545 cars; total, 7,029.

Western shipments increased 201 cars; Eastern decreased 100; Pittsburg decreased 36 cars, leaving the net increase 65 cars.

CHEMICALS AND MINERALS.

NEW YORK, Friday Evening, April 7.

Heavy Chemicals.—The heavy chemical market continues steady and devoid of any features of special interest. The trading, generally, has assumed a routine character that precludes the old time excitement, excepting now and then, when the loss of a ship, like that of the "Naronic," a few weeks ago, creates a momentary shortness of supplies and prices advance somewhat, only to decline a week or two afterward. Caustic soda continues steady and with prices unchanged. Some sales for forward shipment are reported of carbonated soda and alkali. Bleaching powder is practically without change of note, although there have been some more rumors of the cholera breaking out again on the Continent, in consequence of which there has been more inquiry for future shipments. We quote this week: Caustic soda, 60%, 2·95@3·10c.; 70%, 2·70@2 80c.; 74%, 2·72½@2·82½c.; 76%, 2·80@2·90c. Carbonated soda ash, 48%, 1·40@1·60c.; 58%, 1·35@1·40c. Alkali, 48%, 1 35@1·40c.; 58%, 1·30@1·40c., according to package. Sal soda, English, on the spot, 1c.; American, ·90@95c.; bleaching powder, 2 25@2·50c.

Acids.—Dealers here report a remarkably good demand for acids both for spot and for future requirements. Prices are steady but unchanged and there is a dearth of new features in the market. Our quotations this week are as follows: Acid, per 100 lbs. in New York and vicinity, in lots of 50 carboys or more: Acetic, $1.75@$2, according to quality; muriatic, 18°, 90c.@$1.10; 20°, $1@$1.25; 22°, $1.25@$1.50; nitric, 40°, $1; 42°, $4.50@$4.75; sulphuric, 90c.@$1.10; mixed acids, according to mixture, oxalic, $6.30@$6.50. Blue vitriol is quoted all the way from $3.37½ to $3.75; glycerine for nitroglycerine, 11½@12½c., according to quality and quantity.

Brimstone.—Some sales of brimstone at current prices have been made during the past week, but generally speaking the market has been very quiet. Quotations for best unmixed seconds are as follows: On the spot, nominally $25 (there are little or no stocks here). To arrive, and near due, $20; shipments, $19.50. Thirds are 75c. less.

Fertilizing Chemicals.—The market for fertilizers was quiet during the past week and also weaker than for some time past. The ammoniates, without exception, have declined in prices owing to the ending of the active demand from the South. The cotton planting season there is nearly over and Northern consumers are holding off the market in the hope of a still further decline. They can afford to do so for a few weeks more. The Western packers, in view of this, are displaying more anxiety to market their product, and this to a considerable extent has brought about the lower prices which have prevailed this week. Stocks continue light and there is little probability of further shipments of foreign ammoniates to this country. Our quotations this week are as follows: Dried blood, $2.85@$2.90 per unit; azotine, $2.90; sulphate of ammonia, on the spot, $3.25@$2.30 for gas liquor. No bone liquor is offering. Acidulated fish scrap, no stocks on hand; dried scrap is scarce and is quoted at $31 f. o. b. fish factory. Tankage, high grade, $28@$30; low grade, $27@$29. Bone tankage, $24@$25; bone meal, $24@$25.50.

The potash salts generally show no change. The price of double manure salts as fixed by the syndicate is as follows: New York and Boston, $1.12; Philadelphia, $1.14½; Charleston and Savannah, $1.17 cwt. basis, 48@50% in 50 ton lots on foreign weights and analyses. Sulphate of potash, 90%–96%, basis, 90%: New York and Boston, $2.07; Philadelphia, $2.09½; Charleston and Savannah, $2.12 sulphate of potash, 96-99%, basis 90%, is 4% higher.

Muriate of Potash.—The sales of muriate during the week amounted to about 300 tons. Arrivals were also 300 tons. The delay in the shipments of this salt have caused a scarcity of it on the spot. The prices fixed by the syndicate for 1893 are as follows: New York or Boston, $1.7c; Philadelphia, $1.80½; Southern ports, $1.83.

Kainit.—Quotations for shipments previous to September are as follows: New York, Philadelphia and Boston, $8.75 for foreign invoice weight and test, and $9 for actual weight; Charleston, Savannah and Wilmington, $9.50 for invoice weight and test, and $9.75 for actual weight. Shipments after September 1st, 25c. higher.

Nitrate of Soda.—This market continues practically as last reported. The strong feeling noted then has been further emphasized by the shipments of some fair sized cargoes to Europe. Quotations for nitrate on the spot are $2.30. Shipments are held at $1.80.

Messrs. Mortimer & Wisner, the well-known nitrate brokers of this city, have issued the following interesting statistics under date of April 1st:

	1893.	1892.	1891.
	Bags.	Bags.	Bags.
Imported into Atlantic ports from West Coast S. A. from Jan. 1, 1893, to date	128,434	161,465	121,474
Imported into Atlantic ports from Europe	5,225	.....	2,415
	133,659	161,465	123,889
Stock in store and afloat March 1, 1893, in New York	16 040	67,333	30,895
Boston	.....	.....	.....
Philadelphia	.....	.....	.....
Baltimore	1,000	5,600	2,500
To arrive, actually sailed	250,000	254,000	179 5 0
Visible supply to June 1, 1893	267,040	326,333	212,895
Additional charters	200,000	130,000	229,500
Total supply, when shipped	467,040	456,333	442,395
Stock on hand, Jan. 1, 1893	15.454	53,585	36.454
Deliveries past month	57,335	72 333	47,918
Deliveries since Jan. 1 to date	133,073	142,717	126,948
Total yearly deliveries	.....	.....	685,158	634,207
Prices current April 1, 1893	2¼c.	1⅞c.	2¼c.

CURRENT PRICES.

These quotations are for wholesale lots in New York unless otherwise specified.

Acid—Acetic, chem, pure .16@.17
Commercial, in bbls, and cbys .015@.017
Carbonic, liquefied, ℔ lb .18@.25
Chromic, chem pure, ℔ lb 1.00
for batteries .40
Hydrobromic, dilute, U. S. P .25
Hydrocyanic, U. S. P .45
Hydrofluoric .20
Alcohol—95%, ℔ gall $2.30@$2.40
Absolute $3.80
Ammoniated $2.80
Alum—Lump, ℔ cwt $1.75@$1.80
Ground, ℔ cwt $1.85@$1.90
Powdered, ℔ lb .04½@.05
Lump ℔ ton, Liverpool £5
Aluminum Chloride—Pure, ℔ lb. $1.25
Amalgamating solution, ℔ lb .60
Sulphate, ℔ cwt $1.90@$2.50
Ammonia—Sul., in bbl. lots, ℔ lb .02½@.03
Carbonate, ℔ lb., English and German, .07½@.07¾
Muriate, white, in bbls., ℔ lb .08¼
Aqua Ammonia—(in cbys) 18° ℔ lb .03@.04
20°, ℔ lb .04@.05
26°, ℔ lb .05@ 05½
Antimony—Oxymur, ℔ lb .04@.06
Regulus, ℔ lb .10@.11½
Argols—Red, powdered, ℔ lb .15
Arsenic—White, powdered ℔ lb .03@.03½
Red ℔ lb .065@.07
Yellow .08@.09
White at Plymouth, ℔ ton £12 2 6
Asbestos—Canadian, ℔ ton $50@$300
Italian, ℔ ton, c. i. f. L'pool £18@£60
Ashes—Pot, 1st sorts, ℔ lb 4.75@5
Pearl .06@.06¼
Asphaltum—
Prime Cuban, ℔ lb .04@.05
Hard Cuban, ℔ ton $28.00@$30.00
Trinidad, refined, ℔ ton $30.00@$35.00
Egyptian and Syrian, ℔ lb .05@.07½
Californian, at mine, ℔ ton $12.00@$26.00
at San Francisco, ℔ ton. $15.00@$29.00
Barium—Carbonate, pure, ℔ lb .45
Carbonate, commercial, ℔ lb .05@.10
Chlorate, crystal, ℔ lb .75
Chloride, commercial, ℔ lb .05@.10
pure, ℔ lb .16
Iodide, ℔ oz .40
Nitrate, ℔ lb .06¼@.07½
Sulph., Am. prime white, ℔ ton $17.50@$19
Sulph., foreign, floated, ℔ ton $21@$23
Sulph., off color, ℔ ton $11.50@$14.00
Carb., lump, f. o. b. L'pool, ℔ ton £6
No. 1, Casks, Runcorn, " " £4 10 0
No. 2, bags, Runcorn, " " £3 15 0
Bauxite—℔ ton $10.00
Bichromate of Potash—Scotch, ℔ lb .11@.12
American, ℔ lb .11@.12
Bichromate of Soda—℔ lb .09½@.10
Borax—Refined, ℔ lb., in car lots .08@.09
San Francisco .08@.08¼
Concentrated, in car lots .07¼@.08
Refined, Liverpool ℔ ton £2
Bromine—℔ lb .15@0.2
Cadmium Minion—℔ lb $2.00
Cadmium Iodide—℔ lb $5.50
Chalk—℔ ton $1.40@$1.75
Precipitated, ℔ lb .05@.06
China Clay—English, ℔ ton $13@$18.00
Domestic, ℔ ton $9@$11
Chlorine Water—℔ lb .10
Chrome Yellow—℔ lb .10@.25
Chrome Iron Ore—℔ ton, San Francisco $10.00
Chromalum—Pure, ℔ lb .40
Commercial, ℔ lb .12
Cobalt—Oxide, ℔ lb $1.90@$2.00
Copper—Sulph. English Wks. ton £20@£21
Vitriol (blue), ordinary, ℔ lb. 03¾@.04½
" extra .04½
Nitrate, ℔ lb .40
Copperas—Common, ℔ 100 lbs. .90@$1.00
Best, ℔ 100 lbs $1.35@$1.50
Liverpool, ℔ ton, in casks £2@£2 10s.
Corundum—Powdered, ℔ lb. .04½@.09
Flour, ℔ lb .03
Cryolite—Powdered, ℔ lb., bbl. lots .07
Emery—Grain, ℔ lb. (℔ kg.) .04½@.05
Flour ℔ lb .02½@.10
Epsom Salt—℔ lb .01@.01½
Feldspar—Ground, ℔ ton $6.00@$10.00
Crude $2.00@$3 00
Fluorspar—Powdrd, No. 1, ℔ ton. $20@$30
Lump, at mine $6@$8
French Chalk—
Fuller's Earth—Lump, ℔ ton, $16@$20
Glauber's Salt—in bbls., ℔ lb .01@.01¼
Glass—Ground, ℔ lb .10
Gold—Chloride, pure, crystals, ℔ oz. $1 .00
pure, 15 gr., c. v., ℔ doz. $5.40
liquid, 15 gr., g. a. v., ℔ doz $5.50
Chloride and sodium, ℔ oz $6.00
15 gr., c.v., ℔ doz. $2.88
Oxide, ℔ oz $27.25
Gypsum—Calcined, ℔ bbl. $1.25@$1.50
Land Plaster
Iodine—Resublimed $3.30@$3 35
Iridium—Oxide ℔ lb $90
Iron—Nitrate, 40°, ℔ lb .01@.01½
47°, ℔ lb .02@.02½
Kaolin—*See China Clay.*
Kieserite—℔ ton $9@$10
Lead—Red, American, ℔ lb .06¾@.07½
White, American, in oil, ℔ lb. .06½@.07½
White, English, ℔ lb., in oil .08½@.08¾
Acetate, or sugar of, white .06@.06½
Granulated
Nitrate .09@.10
Lime Acetate—Am. Brown .90@.95
" Gray $1.75@$1.87½
Litharge—Powdered, ℔ lb. .06¾@.07½
English flake, ℔ lb .09@.09½
Magnesite—Crude, ℔ ton of 1,015 kilos $14 75
Calcined, ℔ ton of 2,240 lbs $22.00
Brick, ℔ ton of 2,240 lbs $47.50
Manganese—Ore, per unit .23@.28
Oxide, ground, ℔ lb .02½@.06½
Mercuric Chloride—(*Corrosive Sublimate*) ℔ lb .62@.64
Powdered, ℔ lb .50
Marble Dust—℔ bbl $1.25
Metallic Paint—Brown ℔ ton. $20@$25
Red $20@$25
Mineral Wool—Ordinary slag .01¼
Ordinary rock .02½
Ground, ℔ ton
Mica—In sheets according to size.
1st quality, ℔ lb .25@$6.00
Naphtha—Black
Nitre Cake—℔ ton $10.00
Ochre—Rochelle, ℔ lb $1.10@$1.50
Washed Nat Oxf'rd, Lump, ℔ lb .06½@.06¾
Washed Nat Oxf'rd, Powder, ℔ lb .07@.07¼
Golden, ℔ lb .03@.05
Domestic, ℔ ton $12@$20
Oils, Mineral—
Cylinder, light filtered, ℔ gal .14@.16
Dark filtered, ℔ gal .10@.13
Extra cold test, ℔ gal. .2@.24
Dark steam refined, ℔ gal. .09@.12
Phosphorus—℔ lb .5@.55
Precip., red, ℔ lb .82@.85
white, ℔ lb .85@.90
Platinic Chloride—℔ oz $7
Plumbago—Ceylon, ℔ lb .04@.05
American, ℔ lb .05@.07
Potassium—Cyanide, ℔ lb., C. P. .70
67%, ℔ lb .45
fused .40
Bromide, domestic, ℔ lb .25@.28
Chlorate, English, ℔ lb .14@.15
Chlorate, powdered, English, ℔ lb. .14½@.15¾
Carbonate, ℔ lb., by casks, 82% .04½@.05
Caustic, ℔ lb., pure slick .06@.06¼
Iodide, ℔ lb $2.58@$2.80
Nitrate, refined, ℔ lb .06@.08
Bichromate, ℔ lb .10@.11½
Yellow Prussiate, ℔ lb .23
Red Prussiate, ℔ lb .42@.45
Pumice Stone—Select lumps, ℔ lb 03½@.15
Original cks., ℔ lb .01½@.02
Powdered, pure, ℔ lb .01½@.01¾
Pyrites—Non-cupreous, p. units .12@.15
Quartz—Ground, ℔ ton $6.00@$10.00
Rotten Stone, Powdered, ℔ lb. 03¼@.03¾
Lump, ℔ lb .06@.07
Original cks, ℔ lb .04½@.05½
Rubbing stone, ℔ lb .03½@.04
Sal Ammoniac—lump, in bbls., ℔ lb .80¼
Salt—Liverpool, ground, ℔ sack .70
Domestic, fine, ℔ ton $7@$7.5
Common, fine, ℔ ton $4.50@$5
Turk's Island, ℔ bush .26@.28
Salt Cake—℔ ton $10.00@$15.00
Saltpeter—Crude, ℔ lb .03½@.04
Soapstone—Ground, ℔ ton $8@$
Block and slab according to size.
Sodium—Prussiate, ℔ lb .22@.24
Phosphate, ℔ lb .04@.05
Stannate, ℔ lb .06@.12
Tungstate, ℔ lb
Hyposulphite, ℔ lb., in casks .0235@.0245
Strontium—Nitrate, ℔ lb .03¾@.09
Sulphur—Roll, ℔ lb .02½
Flour, ℔ lb .02¾
Sylvinit, 27@35%, S.O.P., per unit .40
Talc—Ground French, ℔ lb .01¼@.01½
American No. 1, ℔ lb .01¾@.01½
American No. 2 .06
Terra Alba—French, ℔ lb .65@.80
English, ℔ lb .65@.80
American, No. 1, ℔ lb .60@.70
American, No. 2, ℔ lb .45@.55
Tin—Crystals, in kegs or bbls .14@.10
feathered or flossed .20
Muriate, single .07@.05
Double or strong, 54° B. .10@.15
Oxymur, or nitro .19
Vermilion—Imp. English, ℔ lb .85@.90
Am. quicksilver, bulk .57 @.6
Am. quicksilver, bags .58 @ .6
Chinese .85 @$1.00
Trieste .90 @ .95
American .11½@ .12
Zinc White—Am., Dry, ℔ lb .04½@ 05
Antwerp, Red Seal, ℔ lb .06¾@.07
Paris, Red Seal, ℔ lb .07½@.08
Muriate solution .06
Sulphate crystals, in bbls., ℔ lb .03¾

THE RARER METALS.

Aluminum—℔ lb .50@.55
Arsenic—(Metallic), per lb .40
Barium—(Metallic), per gram $4.00
Bismuth—(Metallic), per lb $2.25
Cadmium—(Metallic), per lb $1.00
Calcium—(Metallic), per gram $10.00
Cerium—(Metallic), per gram $7.50
Chromium—(Metallic), per gram $1.00
Cobalt—(Metallic), per lb $6.00
Didymium—(Metallic), per gram $9.00
Erbium—(Metallic), per gram $7.50
Gallium—(Metallic), per gram $140.00
Glucinum—(Metallic), per gram $12.00
Indium—(Metallic), per gram $5.00
Iridium—(Fused), per oz $12.00
Lanthanum—(Metallic), per gr. $1.00
Lithium—(Metallic), per gram $10.00
Magnesium—(Powdered), per lb. $4.00
Manganese—(Metallic), per lb $1.10
Chem. pure, per oz. $10.00
Molybdenum—(Metallic), per gm .50
Niobium—(Metallic), ger gram $5.00
Osmium—(Metallic), per oz $65.00
Palladium—(Metallic), per oz $35.00
Platinum—(Plate), per oz $9.75
Potassium—(Metallic), per lb $28.00
Rhodium—(Metallic), per gram $5.00
Ruthenium—(Metallic), per gm. $5.50
Rubidium—(Metallic), per gram $2.00
Selenium—(Metallic), per oz $1.80
Sodium—(Metallic), per lb .50@.75
Strontium—(Metallic), per gm .60
Tantallum (Metallic), per gram $9.00
Telurium—(Metallic), per lb $5.00
Thallium—(Metallic), per gram .20
Titanium—(Metallic), per gram $2.20
Thorium—(Metallic), per gram $17.00
Tungsten—(Metallic), per lb .80
Uranium—(Oxide), per lb .45.00
Metallic, per gm .20
Vanadium—(Metallic), per gm $22.00
Yttrium—(Metallic), per gram $9.00
Zirconium—(Metallic), per oz $65.00

NEW YORK MINING STOCK QUOTATIONS.

DIVIDEND-PAYING MINES.

NAME AND LOCATION OF COMPANY.	April 1.		April 3.		April 4.		April 5.		April 6		April 7.		SALES.
	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Adams, Colo.													
Alice, Mont.													
Amador, Cal.													
Atlantic, Mich.													
Belcher, Nev.													
Belle Isle, Nev.													
Bodie Cons., Cal.	40						25						300
Bos. & Mont., Mont													
Breece, Colo.													
Bulwer, Cal.													
Caledonia, S. Dak.													
Catalpa, Colo.													
Chrysolite, Colo.					‡21								500
Colorado Central, Colo.													
Commonwealth, Nev.													
Comstock T. bonds, Nev.					15.00								1,000
" scrip., Nev.													
Cons. Cal. & Va., Nev.	2.45						2.25		2.30				515
Crown Point, Nev.			.80										200
Deadwood, Dak.													
Enterprise.													
Eureka, Cons., Nev.													
Father de Smet, Dak.													
Freeland, Colo.													
Gould & Curry, Nev.					.57	.50	.55						300
Grand Prize, Nev.													
Hale & Norcross, Nev.							1.00						100
Homestake, Dak.													
Horn-Silver, Utah.													
Independence, Nev.													
Iron Hill, Dak.													
Iron Silver, Colo.													
Leadville Cons., Colo.	.18		.19								.17		2,200
Little Chief, Colo.	.21				.21								600
Martin White, Nev.													
Minnesota Iron													
Mt. Diablo, Nev.													
Navajo, Nev.							.10						200
N. Belle Isle, Nev.													
Ontario, Utah.			16.50		17.00								
Ophir, Nev.	2.20												130
Overman, Nev.													150
Plymouth, Cal.													
Quicksilver, Pref., Cal.													
" Com., Cal.					2.50								100
Quincy, Mich.													
Robinson Cons., Colo.													
Savage, Nev.					.65	.60	.70						250
Sierra Nevada, Nev.	1.00												300
Silver Cord, Colo.													
Silver King, Ariz.													
Silver Min. of L. Valley													
Small Hopes, Colo.	.85												100
Standard Cons., Cal.													
Yellow Jacket, Nev.					.55		.50						300

NON-DIVIDEND-PAYING MINES.

NAME AND LOCATION OF COMPANY.	April 1.		April 3		Apri 4.		April 5.		April 6.		April 7.		SALES
	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Alpha., Nev.													
Alta, Nev													
American Flag, Colo.													
Andes, Cal.													
Astoria, Cal.													
Augusta, Ga.													
" bonds.													
Barcelona, Nev													
Belmont, Cal.	.23		23		22		.23	22	22		.20		1,600
Best & Belcher, Nev.			1.40		1 40		1.50		1.50				400
Bonanza King, Cal.													
Brunswick, Cal.			.08		.08								
Bullion, Nev.			.55										
Butte & Bost., Mont.													100
Castle Creek, Idaho.													
Chollar.									.65				
Comstock T., Nev.					.10		.10		.10		.10		100
Con. Imperial, Nev.													3,200
Con. Pacific, Cal.													
Crescent, Colo.													
Del Monte, Nev.													
El Cristo, Rep. of Col.	.46				.40	.35	.40		.45		.40		
Emmett, Colo													700
Exchequer, Nev.			.30										
Independence, Nev.													300
Julia, Nev.													
Justice, Nev													
Kentuck, Nev													
Lacrosse, Colo.													
Lee Basin, Colo.													
Mexican, Nev.					1.40	1.35	1 35		1.40				
Minnesota Iron													400
Monitor, Colo.													
Monte Cristo, N. S. of C.	3.10				3.15		3 15		3 15				
Nevada Queen, Nev.													550
N. Standard, Cal.													
N. Commonwealth, Nev.													
Occidental, Nev.													
Oriental & Miller, Nev.													
Phœnix Lead, Colo.													
Phœnix of Ariz.	.30	.25							25		.25		1,200
Potosi, Nev.													
Rappahannock, Va.													
S. Sebastian, S. Sal.													
Santiago													
Scorpion, Nev.													
Seg. Belcher, Nev.													
Shoshone, Idaho.													
Silver Hill, Nev.													
Sullivan Con., Dak.													
Sutro Tunnel, Nev.													
Syndicate, Cal.													
Tornado Con., Nev.	.06	.05											
Union Cons., Nev.	.80								1 05				700
Utah, Nev.													

Ex-dividend. †Dealt in on New York Stock Ex. ‖Dissolved securities. ‡Assessment paid. §Assessment unpaid. Dividend shares sold, 7,145. Non-dividend shares sold, 12,550
To al shares sold, 19,695.

BOSTON MINING STOCK QUOTATIONS.

NAME OF COMPANY.	Mar. 31.		Apr. 1.		Apr. 3.		Apr. 4.		Apr. 5.		Apr. 6.		SALES.
Atlantic, Mich.													
Bodie, Cal.													
Bonanza Development.													
Bost. & Mont., Mont.			31 00				31.25	30.90	31 00	30.75			1,276
Breece, Colo.													
Calumet & Hecla, Mich.					310	308	308	3.7	310				121
Catalpa, Colo.													
Central, Mich.													
C eur d'Alene, Id.													
Con. Cal. & Va., Nev.													
Dunkin, Colo.			14.00										200
Eureka, Nev.													
Franklin, Mich.			12.63	12.50			12 50	12.25					375
Honorine, Utah.													
Horn Silver, Utah.													
Kearsarge, Mich.					9 50		9.00		8.50				105
Lake Superior, Iron.													
Little Pittsburg, Colo.													
Minnesota Iron, Minn.													
Napa, Cal.													
Ontario, Utah.													
Osceola, Mich.							35.00	34.63	31.50	34.25			523
Quincy, Mich.													
Ridge, Mich.													
Sierra Nevada, Nev.													
Silver King, Ariz.													
Stor nont, Utah.													
Tamarack, Mich.					162		163	162	165				13
Tecumseh, Mich.													

NAME OF COMPANY.	Mar. 31.		Apr. 1.		Apr. 3		Apr. 4.		Apr. 5.		Apr. 6.		SALES
Allouez, Mich.									.60				100
Arnold, Mich.													
Aztec, Mich.													
Brunswick, Cal.													
Butte & Boston, Mont.					10 25		10 00	9.88	9.75				890
Centennial, Mich.					8.50				8 00				115
Colchis, N. Mex.													
Copper Falls, Mich.													
Crescent, Colo.													
Dana, Mich.													
Don Enrique, Mex.													
Geyser, Colo.													
Hanover, Mich.													
Humboldt, Mich.													
Hungarian, Mich.													
Huron, Mich.													
Mesnard, Mich.													
National, Mich.													
Native, Mich.													
Oriental & M., Nev.													
Phœnix, Ariz.													
Pontiac, Mich.													
Rappahannock, Va.													
Santa Fe, N. Mex.			.05		.05								1,200
Shoshone, Idaho.													
South Side, Mich.													
Tamarack, Jr., Mich.	22 50	21.50	23.00						22 00				10
Washington, Mich.													
Wolverine, Mich.							2.75						

Dividend shares sold, 2,613. Non-dividend shares sold, 2,361. Total shares sold, 4,974.

DIVIDEND-PAYING MINES.

	Name and Location of Company.	Capital Stock.	Shares. No.	Shares. Par	Assessments. Total levied.	Assessments. Date and amount of last			Dividends. Total paid.	Dividends. Date & amount of last.		
1	Adams, s. L. C.	Colo.	$1,500,000	1,500,000	$10	*			$637,500	Jan.	1892	.05
2	Alaska-Treadwell, g.	Al'ska	5,000,000	200,000	25				1,450,000	Oct.	1892	.37½
3	Alice, s.	Mont.	10,000,000	400,000	25	*			975,000	Nov.	1891	.06¾
4	Alma & Nel Wood., g	Idaho	300,000	30,000	10	*			60,000	Jan:	1889	.50
5	Amador, g.	Cal.	1,250,000	250,000	5	*			31,250	Aug.	1890	.12½
6	American, g.	Colo.	3,000,000	300,000	10	*			225,000	Mar.	1892	.05
7	American Belle, s. g. c	Colo.	2,000,000	400,000	5	*			50,000	April	1891	.12½
8	Americ'n & Nettie, g. s	Colo.		300,000					175,000	Mar.	1892	.05
9	Atlantic, c.	Mich.	1,000,000	40,000	25	280,000	April	1875	$1.00	700,000	Feb.	1891	1.00
10	Argenta, s.	Nev.	10,000,000	100,000	100	335,000	July.	1889	.10	40,000	Feb.	1880	.20
11	Argyle, g.	Colo.	1,000,000	1,000,000	1	*				20,000	Mar.	1892	.01
12	Aspen Mg. & S., s. L.	Colo.	2,000,000	200,000	10	*				760,000	Sept.	1892	.10
13	Aurora, I.	Mich.	2,500,000	100,000	25					650,000	Feb.	1893	2 00
14	Badger, s	Ont.	250,000	50,000	5					37,500	Mar.	1890	.25
15	Bald Butte	Mont	250,000	250,000	1	*				72,500	Mar.	1892	.03
16	Bates Hunter, s. g.	Colo.	1,000,000	1,000,000	1						Dec.	1891	.00¾
17	Belle Isle, s.	Nev.	10,000,000	100,000	100	220 00	Aug.	1892	.10	300,000	Dec.	1879	.25
18	Belcher, s. g.	Nev.	10,400,000	104,000	100	3,16 00	May	1892	.25	15,397,000	April	1876	1.00
19	Bellevue, Idaho, s. L.	Idaho	1,250,000	125,000	10	1. 000	Dec.	1889	.25	200,000	Jan.	1890	.10
20	Best Friend	Colo.	1,000,000	1,000,000	1					90,000	Feb.	1892	.01
21	Bi-Metallic, s. G.	Mont.	5,000,000	200,000	25					2,222,000	Feb.	1893	.20
22	Bodie Con. G. I.	Cal.	10,000,000	100,000	100	0,000	June	1890	.25	1,662,572	April	1893	.50
23	Boston & Mont., G.	Mont.	2,500,000	250,000	10	*				520,000	June	1886	.15
24	Boston & Mont., c. s.	Mont.	3,125,000	125,000	25	*				2,075,000	Nov.	1891	1.00
25	Brooklyn Lead, L. s.	Utah	500,000	50,000	10					127,000	July	1887	.05
26	Brotherton, I.	Mich.	2,000,000	80,000	25	*				120,000	Mar.	1893	.50
27	Bulwer, G.	Cal.	10,000,000	100,000	10	30,000	Aug.	1889	.25	195,000	Oct.	1892	.03¾
28	Bunker Hill & S. s. L.	Idaho	3,000,000	300,000	10	*				150,000	Oct.	1888	.06
29	Caledonia, G.	Dak.	10,000,000	100,000	100	505,000	May	1885	.15	192,000	Oct.	1890	.08¾
30	Calliope, s.	Colo.	1,000,000	1,000,000						140,000	Jan.	1891	.00
31	Calumet & Hecla c	Mich.	2,500,000	100,000	25	1,200,000				38,850,000	Dec.	1892	5 00
32	Centen'l-Eureka, s. I.	Utah	1,500,000	30,000	50					607,500	Feb	1893	.50
33	Central, c.	Mich.	500,000	20,000	25	100,000	Oct.	1861	.65	1,950,000	Feb.	1891	1.00
34	Champion, G	Cali	340,000	34,000	10					125,100	Mar.	1893	.10
35	Chrysolite, s. L.	Colo.	10,000,000	200,000	50	*				1,650,000	Dec.	1884	.25
36	Clay County, G.	Colo.	200,000	200,000	1	*				56,000	Nov.	1891	.02
37	Clinton Con, g.	Cal.	5,000,000	100,000	5					90,000	Nov.	1891	.10
38	Cœur D'Alene, s. L.	Idaho	5,000,000	500,000	10					810,000	Nov.	1891	.02
39	Colorado Central, s. L.	Colo.	2,750,000	275,000	10	*				502,500	Jan.	1892	.05
40	Commonwealth, s.	Nev.	10,000,000	100,000	100	190,000	Sept.	1892	.10	20,000	Nov.	1890	.20
41	Confidence, s. L.	Nev.	2,496,000	24,960	100	1,589,550	Aug.	1892	.50	199,680	April	1889	1.00
42	Cons. Cal. & Va., s. G	Nev.	21,600,000	216,000	100	108,000	Jan.	1885	.20	3,682,800	Aug.	1891	.50
43	Contention, s.	Ariz.	12,500,000	250,000	50					2,637,500	Aug.	1892	.20
44	Cook's Peak, s.	N. M.	2,000,000	200,000	10					114,532	Nov.	1892	.05
45	"Cop. Queen Con., c.	Ariz.	2,000,000	200,000	10					1,360,000	Feb.	1893	.50
46	Coptis.	Nev.	10,000,000	100,000	100					67,000	July.	1892	.12
47	Cortez, s.	Nev.	1,500,00	300,000	05	*				687,000	Mar.	1892	.50
48	Crescent, s. L. G.	Utah	15,000,000	600,000	25	60,000	Oct.	1892	.10	238,000	Oct.	1888	.03
49	Crown Point, G. s.	Nev.	10,000,000	100,000	100	2,700,000	Sept.	1892	.25	11,898,000	Jan.	1875	2.00
50	Cumberland, L. s.	Mont.	5,000,000	500,000	10	*				15,000	Nov.	1889	.03
51	Daly, s. L.	Utah	3,000,800	150,000	20					2,687,500	Feb.	1893	.25
52	Deer Creek, s. G.	Idaho	1,000,000	200,000	5	*				20,000	June	1889	.05
53	Deadwood-Terra, G.	Dak.	5,000,000	200,000	25	*				1,150,000	Oct.	1892	.05
54	Delamar, s. G.	Idaho	2,000,000	400,000	5					550,000	Oct.	1892	.25

NON-DIVIDEND-PAYING MINES.

	Name and Location of Company.	Capital Stock.	Shares. No.	Shares. Par	Assessments. Total levied.	Assessments. Date and am't of last.		
1	Alliance, s. G.	Utah.	$100,000	100,000	$1	$120,000	Feb.	1891 .20
2	Allouez, c.	Mich.	2,000,000	80,000	25	737,000	Jan.	1890 .70
3	Alpha Con., G. s.	Nev.	3,000,000	30,000	100	209,000	Sept.	1892 .10
4	Alta, s.	Nev.	10,080,000	100,800	100	3,369,880	Jan.	1892 .10
5	American. c.	Idaho	5,000,000	500,000	100			
6	American Flag, s.	Colo.	1,250,000	125,000	1	300,000	June	1887
7	Amity, s.	Colo.	250,000	250,000	20			
8	Anchor, s. L. G.	Utah.	3,000,000	150,000	5	410,000	June	1890 .20
9	Anglo-Montana, Lt.	Mont.	600,000	120,000	125			
10	Appalachian, g.	N. C.	1,750,000	1,400,000	20			
11	Arizona, c.	Ariz.	3,575,000	160,000	2			
12	Astoria, G.	Cal.	200,000	100,000	5			
13	Atlanta, g. s.	Idaho	3,250,000	650,000	25			
14	Barcelona, G.	Nev	5,000,000	200,000	5	*		
15	Bear Creek	Idaho		20,000	1			
16	Belmont, G.	Cal.		500,000	100	*		
17	Belmont, s.	Nev.	5,000,000	50,000	100	735,000	April	1886 .10
18	Best & Belcher, s. G.	Nev.	10,080,000	100,800	10	2,405,275	Aug.	1892 .25
19	Black Oak, G.	Cal.	3,000,000	300,000	100	*		
20	Boston Con., G.	Cal.	10,000,000	100,000	1	170,000	Nov.	1888 .25
21	Brownlow, G.	Colo.	250,000	250,000	5			
22	Brunswick, G.	Cal.	2,000,000	400,000	2			
23	Buckeye, s. L.	Mont.	1,000,000	500,000	100			
24	Bullion, s. G.	Nev.	10,000,000	100,000	100	2,890,000	Aug.	1892 .25
25	Burlington, G. s.	Cal.	10,000,000	100,000				
26	Butte & Boston, c. s.	Mont.	5,000,000	200,000	10			
27	Butte Queen, G.	Cal.	1,000,000	100,000	1	6,000	Jan.	1892 .04
28	Calaveras, G.	Cal.	500,000	500,000	5			
29	Calaveras Con., g.	Cal.	800,000	160,000	10			
30	California, G.	Cal.	1,000,000	100,000	5	9,000	Mar.	1892 .03
31	California Con. I. Q.	Cal.	2,250,000	450,000	10			
32	Camille, g	Ga	1,500,000	150,000	5			
33	Carisa, G.	Wy.	500,000	100,000	2	*		
34	Carupano, G. s. L. C.	Ven.	200,000	100,000	2	*		
35	Cashier, G. s.	Colo.	500,000	250,000	100	*		
36	Challenge Con., g. s.	Nev.	5,000,000	50,000	10			
37	Cherokee, G.	Cal.	1,500,000	150,000	100			
38	Chollar, s. G.	Nev.	11,200,000	112,000	2	1,830,000	May.	1892 .50
39	Cleveland, T.	Dak.	1,000,000	500,000	10	*		
40	Colchis, s. G.	N. M.	500,000	150,000	5			
41	Colorado, s.	Colo.	1,625,000	325,000	1			
42	Comstock, s.	Utah.	1,250,000	250,000	100			
43	Comstock Tun.	Nev.	10,000,000	100,000	100	35,000	Mar.	1887 .15
44	Con. Imperial, G. s.	Nev.	5,000,000	50,000	50	2,062,500	Jan.	1892 .25
45	Con. New York, s. G.	Nev.	5,000,000	100,000	100	110,000	Mar.	1892 .10
46	Con. Pacific, G.	Cal.	6,000,000	60,000	10	198,000	June	1890 10
47	Con. Silver, s.	Mo.	2,500,000	250,000	5			
48	Cordova Union, g.	Cal.	1,000,000	200,000	10			
49	Crescent, s. L.	Colo.	3,000,000	300,000	100	*		
50	Crocker, s.	Ariz.	10,000,000	100,000	1	165,000	Aug.	1892 .05
51	Crowell, G.	N. C.	500,000	500,000	1			
52	Dahlonega, G.	Ga.	250,000	250,000	10	*		
53	Dandy, s.	Colo.	5,000,000	500,000				
54	Decatur s	Colo.	1,500,000	300,000				

DIVIDEND-PAYING MINES.

	Name and Location of Company.		Capital Stock.	Shar s		Assessments.			Dividends.		
				No.	Par	Total Levied.	Date and amount of last		Total paid.	Date & amount of last.	
55	Derbee B. Grav., G ..	Sl..	1,000,00	100,000	0	100,000	Sept,	1892 .10	60,000	Aug..	1891 .10
56	Dexter, g. s	Nev..	1,000,000	100,000	10	.....	.....	.....	80,000	Aug..	1892 .25
57	Dunkin, s. L....	Colo..	5,000,000	200,000	25	*	.....	.....	390,000	Oct..	1889 .05
58	Elkhorn, s. L....	Mont.	1,000,000	200 00	5	*	.....	.....	973,045	Mar.	1893 .10
59	Enterprise, s.	Colo..	2,500,000	500,000	5	*	.....	.....	750,000	Feb.	1893 .15
60	Eureka Con., s. L., G.	Nev...	500,000	50,000	10	*	.....	.....	1,450,000	Dec.	1889 .2
61	Evening Star, s. L....	Colo..	10,000,000	100,000	100	200,000	Nov..	1878 1.00	1,125,000	Dec..	1885 .20
62	Father de Smet, G..	Dak..	1,000,000	40,000	25	220,000	June	1871	1,100,00	July	1892 2.00
63	Franklin, C..	Mich..	5,000,000	200,000	25	*	.....	.....	190,000	July.	1886 .10
64	Freeland, s. G.....	Colo..	1,000,000	100,000	5	.....	.....	.....	90,000	April	1888 .12½
65	Garfield Lt., G. s....	Nev ..	500,000	100,000	10	.....	.....	.....	10,000	June	1891 .10
66	Glengarry	Mont.	1,000,000	100,000	1	.....	.....	.....	.....	Dec..	1891 .01
67	Gold Rock.....	Colo..	500,000	500,000	5	.....	.....	.....	75,000	Feb.	1893 .02
68	Golden Reward. . .	S.Dak	1,250,000	250,000	100	4,591,200	June	1892 .25	3,826,800	Oct..	1870 10.00
69	Gould & Curry, s. G..	Nev...	10,800,000	108,000	100	785,000	Jan..	1890 .30	495,000	Mar.	1884 .25
70	Grand Prize, s.....	Nev...	10,000,000	100,000	1	*	.....	.....	83,400	Nov..	1890 .02
71	Granite, s. L..... ..	Idaho	10,000,000	400,000	25	.....	.....	.....	12,120,000	July.	1892 .20
72	Granite Mountain, s.	Mont.	5,000,000	50,000	100	.....	.....	.....	394,861	Dec.	1892 .25
73	Great Western, L. Q..	Cal...	1,250,000	125,000	10	*	.....	.....	212,000	Nov..	1891 .07½
74	Green Mountain, G..	Cal...	11,200,000	112,000	100	5,534,800	Aug.	1892 .50	1,822,000	Aug.	1888 .50
75	Hale & Norcross, G. s.	Nev...	1,500,000	90,000	50	.....	.....	.....	1,950,000	Feb	1893 .50
76	Hecla Con., s. G. L. C.	Mont.	3,315,000	663,000	5	*	.....	.....	197,970	July.	1886 .06
77	Hel'a Mg.& Red,s.L.G.	Mont.	2,500,000	500,000	5	.....	.....	.....	170,000	July..	891 .02
78	Helena & Frisco, s.L.	Idaho	1,000,000	200,000	5	.....	.....	.....	80,000	May..	1891 .05
79	Helena & Victor.....	Mont.	10,000,000	100,000	100	370,000	May..	1890 .25	75,000	April	1886 .25
80	***Holmes, s.....	Nev...	12,500,000	125,000	100	200,000	July.	1878 1.00	4,953,750	Feb..	1893 .10
81	Homestake, G.....	Dak..	500,000	250,000	2	37,500	April	1889 .05	125,000	Sept.	1887 .05
82	Honorine, s. L.....	Utah.	1,000,000	100,000	10	*	.....	.....	433,252	Apr.	1893 .25
83	Hope, s.....	Mont.	10,000,000	400,000	25	*	.....	.....	4,70,,000	Mar.	1893 .12½
84	Horn-Silver, s. L.....	Utah.	1,000,000	1,000,000	1	*	.....	.....	247,000	Dec..	1889 .00½
85	Hubert, G.....	Colo..	310,000	3,100	100	.....	.....	.....	5,419,250	Dec.	1892 2.50
86	Idaho, G.....	Cal...	1,000,000	40,000	1	*	.....	.....	45,000	April	1889 .20
87	Illinois, s.....	N. M..	100,000	100,000	10	134,000	July.	1889 .03	156,250	Nov..	1887 .07½
88	Iron Hill, s.....	Dak..	2,500,000	250,000	10	*	.....	.....	2,15,000	Aug..	1892 .03
89	Iron Mountain, s....	Mont.	5,000,000	500,000	20	*	.....	.....	2,500,000	April	1889 .20
90	Iron-Silver, s. L.....	Colo..	10,000,000	500,000	100	100,000	Sept.	1892 .10	260,000	Aug	1891 .10
91	Jack Rabbit, G.....	Cal...	10,000,000	100,000	100	237,500	Nov..	1880 .20	60,000	Jan.	1891 .10
92	Jackson, G. s..... ...	Nev..	5,000,000	50,000	100	190,000	Oct..	1887 1.00	80,000	Jan.	1890 2.00
93	Kearsarge, C.....	Mich..	1,000,000	40,000	25	.....	.....	.....	387,000	May..	1892 .15
94	Kennedy	Cal...	10,000,000	100,000	100	454,180	Oct..	1891 .15	1,350,000	Dec.	1886 .10
95	Kentuck, s. G.....	Nev..	3,000,000	30,000	100	*	.....	.....	610,000	Sept.	1882 .30
96	La Plata, s. L.....	Colo..	2,000,000	200,000	10	*	.....	.....	316,500	Feb..	1893 .03
97	Leadville Con., s. L..	Colo..	4,000,000	400,000	10	*	.....	.....	609,000	Jan..	1890 2.00
98	Lexington, G. s.	Mont.	4,000,000	40,000	100	*	.....	.....	820,000	Dec..	1890 .05
99	Little Chief, s. L.....	Colo..	10,000,000	200,000	50	*	.....	.....	220,000	Dec..	1891 .02
100	Little Rule, s.....	Colo..	500,000	500,000	1	.....	.....	.....	557,757	April	1892 .25
101	Maid of Erin.....	Colo..	3,000,000	600,000	2½	*	.....	.....	1,000,000	Dec...	1891 .10
102	Mammoth, s. L. C.....	Utah.	10,000,000	400,000	250	110,000	.....	1882 .25	140,000	Dec..	1886 .25
103	Martin White, s.....	Nev..	10,000,000	100,000	100	1,275,000	Jan..	1892 .25	175,000	May..	1888 5.00
104	Mary Murphy, s. G...	Colo..	100,000	3,500	101	*	.....	.....	15,000	Feb..	1890 .00½
105	Matchless, s. L	Colo..	500,000	500,000	1	*	.....	.....	117,000	April	1892 .03
106	Maxfield	Utah.	3,000,000	300,000	10	.....	.....	.....	120,000	Mar.	1893 .10
107	Mayflower, D. gravel	Cal...	1,000,000	100,000	10	.....	.....	.....	205,000	Oct..	1891 .03¾
108	May Hazeppa, s. L...	Colo..	1,000,000	100,000	1	*	.....	.....	350,000	Dec..	1890 .50
109	Minas Prietas, G. s...	Mex..	1,000,000	100,000	10	.....	.....	.....	1,820,000	Mar	1876 .....
110	Minnesota, C.....	Mich..	1,000,000	40,000	25	420,000	April	1886 1.00	3,300,000	April	1893 .15
111	Mollie Gibson, s....	Colo..	5,000,000	1 000,000	5	.....	.....	.....	45,000	Oct.	1890 .03
112	Monitor, G.....	S.Dak	2,500,000	250,000	10	*	.....	.....	12,500	Mar	1886 .25
113	Mono, G.....	Cal...	5,000,000	50,000	100	760,000	Sept.	1890 .25	2,619,075	June.	1891 .12½
114	Montana, Lt., G. s....	Mont.	3,300,000	660,000	5	*	.....	.....	925,000	April	1891 .25
115	Morning Star, s. L...	Colo..	1,000,000	100,000	10	.....	.....	.....	111,800	Dec...	1892 3.00
116	Morning Star Drift, G	Cal...	240,000	2,400	100	.....	.....	.....	410,000	Nov.	1892 .07½
117	Moulton, s. G.....	Mont.	2,000,000	400,000	5	*	.....	.....	210,000	July.	1891 .20
118	Mt. Diablo, s.....	Nev..	5,000,000	50,000	100	137,500	June	1880 2.00	540,000	Apr.	1893 .20
119	Napa, G.....	Cal...	700,000	100,000	7	.....	.....	.....	229,950	April	1889 .10
120	Navajo, G. s..... ...	Nev..	10,000,000	100,000	100	520,000	May.	1891 20	10,000	May..	1891 .05
121	Newton.....	Cal...	10,000,000	100,000	100	.....	.....	.....	48,800	May..	1890 .12½
122	New California, G....	Colo..	800,000	160,000	5	*	.....	.....	1,877,500	April	1892 .75
123	New Guston, s.....	Colo..	550,000	110,000	5	.....	.....	.....	20,000	July..	1891 .05
124	North Banner Con..	Cal...	1,000,000	100,000	10	.....	.....	.....	25,000	June.	1891 .25
125	North Commonw'th	Nev ..	10,000,000	100,000	10	.....	.....	.....	30,000	Dec..	1885 .06½
126	N. Hoover Hill, G. s..	N. C ..	300,000	120,000	2½	*	.....	.....	90,000	May ..	1888 .50
127	North Belle Isle, s...	Nev..	10,000,000	100,000	100	474,689	Nov.	1892 .10	230,000	May ..	1893 .50
128	North Star, G.....	Cal..	1,000,000	100,000	10	.....	.....	.....	400,000	Mar..	1892 .15
129	Omaha Cons., G.....	Cal...	2,400,000	24,000	100	.....	.....	.....	30,000	May..	1892 .50
130	Ontario, s. L.....	Utah	15,000,000	150,000	100	.....	.....	.....	13,175,000	Oct..	1892 .50
131	Ophir, G. s.....	Nev..	10,000,000	100,000	100	4,210,640	April	1890 .50	1,595,800	Jan..	1880 1.00
132	Original, s. C.....	Mont.	1,500,000	60,000	25	*	.....	.....	138,000	Jan..	1889 .05
133	Oro, s. L. G.....	Colo..	500,000	100,000	5	.....	.....	.....	95,000	July	1890 .20
134	Osceola, C.....	Mich..	1,250,000	50,000	25	480,000	April	1876 1.60	1,697,500	Dec.	1892 1.00
135	Pacific Coast, B.....	Cal...	1,500,000	15,000	100	.....	.....	.....	360,000	Dec.	1892 1.00
136	Parrot, C.....	Mont.	1,800,000	180,000	10	.....	.....	.....	1,405,385	Dec.	1892 .10
137	Petro.....	Utah.	10,000,000	10,000	100	.....	.....	.....	17,500	July	1891 .75
138	Plumas Eureka, G....	Cal...	1,406,250	140,625	10	.....	.....	.....	2,643,559	April	1892 .18
139	Plymouth Con , G....	Cal...	5,000,000	100,000	50	*	.....	.....	2,280,000	Feb.	1889 .40
140	Poorman, G. s	Idaho	375,000	300,000	125	*	.....	.....	68,260	Sept	1892 ...
141	Quicksilver, pref., Q.	Cal...	4,300,000	43,000	100	.....	.....	.....	1,82,,811	June	1891 1.25
142	" com., Q	Cal...	5,700,000	57,000	100	.....	.....	.....	645 967	July.	1892 .40
143	Quincy, C....	Mich..	1,250,000	50,000	25	200,000	Dec..	1862	6,470,000	Feb.	1893 3.06
144	Red Cloud.....	Idaho	1,000,000	200,000	5	.....	.....	.....	153,100	Dec.	1892 .10
145	Reed National, s. G..	Colo..	500,000	500,000	1	*	.....	.....	50,000	Dec..	1890 .01
146	Retriever, L.....	S.Dak	1,250,000	250,000	5	.....	.....	.....	20,000	Aug..	1891 .03
147	Rialto, G.....	Colo..	300,000	300,000	1	*	.....	.....	50,250	April	1892 .01½
148	Richmond, s. L.....	Nev..	1,350,000	54,000	25	*	.....	.....	4,346,325	Aug..	1891 .25
149	Ridge, C.....	Mich..	500,000	20,000	25	219,939	Mar.	1886 50	99,785	Feb..	1880 .50
150	Robinson Con., s. L..	Colo..	10,000,000	200,000	50	*	.....	.....	585,000	Mar.	1886 .05
151	Running Lode, G....	Colo..	1,000,000	1,000,000	1	*	.....	.....	36,000	May .	1892 00 1-10
152	Savage, s.....	Nev..	11,200,000	112,000	100	6,772,000	Feb..	1892 .50	4,460,000	June	1869 3.00
153	Sheridan, s. G.....	Colo..	300,000	3,000	100	*	.....	.....	300,000	Oct..	1891 2.50
154	Shoshone, G.....	Idaho	150,000	150,000	1	.....	.....	.....	7,500	April	1883 .01
155	Sierra Buttes, G.....	Cal...	2,225,000	122,500	10	.....	.....	.....	1,529,307	Oct.	1892 .18
156	Sierra Nevada, s. G..	Nev..	10,000,000	100,000	100	6,411,910	June	1892 .25	102,000	Jan..	1871 1.00
157	Sierra Nevada, s. L..	Idaho	1,000,000	1,000,000	1	*	.....	.....	40,000	May..	1889 .02
158	Silent Friend.....	Colo..	500,000	500,000	1	.....	.....	.....	60,000	Aug..	1891 .02½
159	Silver Cord, s. L. G...	Colo..	4,500,000	450,000	10	.....	.....	.....	265,000	April	1889 .10
160	Silver King, s.....	Ariz..	10,000,000	100,000	100	130,000	Nov.	1890 .30	1,950,000	July	1887 .25
161	Silver Mg.of L.V.,s.L.	N. M..	500,000	500,000	1	.....	.....	.....	300,000	Dec..	1891 4.05
162	Slide.....	Colo..	500,000	5,000	100	.....	.....	.....	20,000	Nov..	1891 4.00
163	Small Hopes Con., s.	Colo..	5,000,000	250,000	20	*	.....	.....	32,00,000	Nov..	1892 .15
164	Spring Valley, G.....	Cal...	200,000	200,000	1	50,000	Oct.	1881 .25	50,000	Jan..	1881 .25
165	Standard, G. s.....	Cal...	10,000,000	100,000	100	100,000	June	1879 .50	3,655,000	Mar..	1893 .10
166	Stormont, s.....	Utah.	500,000	500,000	1	*	.....	.....	155,000	Nov.	1884 .05
167	St. Joseph, L.....	Mo...	1,500,000	150,000	10	*	.....	.....	1,974,000	Dec..	1890 .02
168	Swansea, g. s.....	Colo..	600,000	60,000	10	.....	.....	.....	27,000	Mar.	1893 .10
169	Tamarack, C.....	Mich..	1,250,000	50,000	25	520,000	April	1885 3.00	3,160,000	Oct..	1892 .00
170	Teal & Poe.....	N. M..	150,000	150,000	1	*	.....	.....	9,000	Nov.	1891 .01½
171	Tombstone, G. & L....	Ariz..	12,500,000	500,000	25	*	.....	.....	1,250,000	April	1882 .10
172	Trinity Riv'r Hydr.,G	Colo..	500,000	500,000	1	*	.....	.....	5,000	Mar..	1893 .00½
173	Tuscarora, C.....	Ariz..	3,000,000	300,000	10	*	.....	.....	207,500	Jan..	1892 .10
174	Victor, G	Colo..	1,000,000	200,000	5	.....	.....	.....	10,000	April	1893 .05
175	Viola Lt., s. L.....	Idaho	750,000	150,000	5	.....	.....	.....	337,500	Nov.	1892 .37½
176	Ward Con., s.....	Colo.	2,000,000	200,000	10	.....	.....	.....	20,000	Dec.	1889 .05
177	Woodside, s. L..... ..	Utah	100,000	100,000	10	.....	.....	.....	25,000	Oct..	1889 .25
178	W. Y. O. D.	Cal...	30,000	15,000	4	22,500	May.	1891 .10	42,000	Dec.	1892 .10
179	Yankee Girl, s.....	Colo.	1,300,000	260,000	5	.....	.....	.....	1,406,000	April	1891 1.50
180	Yellow Jacket, G. s.	Nev ..	12,000,000	130,000	10	5,808,000	Sept	1892 .25	2,184,000	Aug.	1871 1.50
181	Yosemite No. 2.....	Utah.	1,000,000	100,000	10	.....	.....	.....	25,000	Oct..	1891 .05
182	Young America, G....	Cal...	.....	.....	.....	.....	.....	.....	175,000	Jan..	1888 1.00
..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....

COAL AND COAL RAILROAD STOCKS.

NAMES OF STOCKS.	April 1.		April 3.		April 4.		April 5.		April 6.		April 7.		Sales.
	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Am. Coal													
Balt. & Ohio							90		9 4/8		90 7/8		70
do. pref													
Buff., R. P.			35	34 3/8	37 3/8				35 3/4				650
do. pref													
Cambria Iron					53								30
Ches. & Ohio	24 7/8	24 3/4	24 7/8	24 3/8	24 3/4	24 1/4	25 1/4	24 1/2	26	25	25 3/4	25 1/8	39,435
do. 1st pref													
do. 2d pref													
Col. C. & I	21 7/8	21 1/2	22				22	21 7/8	21 1/2				1,000
Col. Coal													
Colorado Fuel	68				68 1/2	68	68 3/4	68 1/4	69	68 3/4	69	68 3/4	3,750
do. pref													
Col., H. V. & Tol			28 3/4	28 1/2	28 1/4		28 1/8	28 1/2					830
do. pfd													
Col. & H. Coal	19 1/2								20 1/2	19 1/2			600
do. pfd													
Cons. Coal													
Del. & Hud. C	132	130 3/8	132 1/4	131 3/8	131	130	132 3/4	131	133	131 3/4	132	131 3/4	5,634
Del., L. & West	147 3/4	146 1/4	148 1/4	146 3/8	147 3/8	146 1/4	146 1/2	144 1/2	146	145	145 1/2	144 3/4	32,741
Hunt. & B. Top							34						25
do. pref					51				52				114
Lake Erie & Wes			23 7/8	23 1/4			24 1/4	22	23 7/8	23			3,388
do. pref							80	78 1/2	80 3/4	80 1/2	80		5,142
Lehigh C. & N	51 1/2		52	51 7/8	53	52 3/8	52 3/4		52 3/4	52 3/8			541
Lehigh Valley	48 1/4	47 1/2	48 3/4	48 1/4	48 3/8	48 1/2	49 5/8	48 3/4	49 1/4	49			4,424
Mahoning Coal													
do. pref													
Maryland Coal							26						211
Morris & Essex									152 1/2				129
New Cent. Coal													
N. J. Central	122	120	122	121 1/2	121 1/2		122	121 1/2	122				1,751
N. Y., L. & W													
N. Y., L. E. & W	22 1/4	21 7/8	22 1/8	21 3/4	21 3/4	21	22	21	22 1/8	21 1/2	22	21 1/2	29,650
do. pref	48 3/4	48	48 3/8		48 3/4	47	49		48 3/4		48		1,040
N. Y., Susq. & W	18 3/4		19	18 3/4	19	18 3/4	19		19		19 3/8	18 3/8	3,501
do. pref	72		72		72 1/2	72			72 1/4	72	71 1/2	71	2,150
N. & West													
do. pref					32 3/4		32 1/4		32 1/2				300
Penn. R. R	53 3/4	53 3/8	53 3/4	53 1/2	53 3/8		53 3/4	53 1/2	54	53 3/4			7,848
Phil. & Reading	24 3/8	23 7/8	24 1/8	23 3/4	24	23 1/8	25	23 7/8	25 1/8	24 1/4	24 1/8	23 7/8	128,991
Penn. C. & I	27 3/8	27	27 1/2	27	26 3/4	25 7/8	27	25 3/4	26 1/2	26	27	26 3/4	12,135
do. pref													
Wheel. & L. E.	18 3/8		18 1/2	17 1/2	18	17 3/8	18						810
do. pref	58				58								255

Total shares sold, 285,443.

INDUSTRIAL AND TRUST STOCKS.

NAME OF STOCKS.	April 1.		April 3.		April 4.		April 5.		April 6.		April 7.		SALES.
	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	H.	L.	
Adams Express							159 1/2						32
Am. Cotton Oil	50 3/4	49 3/4	49 3/4	47 3/8	49 1/2	48 1/2	49 3/4	48 1/4	49 7/8	49	49	48 3/4	28,850
do. pref			82	81 3/4	82 1/4	82	82 3/4	82 3/8	82 3/8	82 1/2			1,930
Am. Dist. Tel							55 1/2		57 3/4				45
Am. Express			118	116 1/2					118				188
Am. Sugar Ref	105 3/4	106 1/4	107 1/2	106 3/4	107 3/8	106 3/4	107	104 7/8	107	105 1/2	106 3/8	105 3/4	182,050
do. pref	99 3/4				100		99 3/4	99 1/2	100	99 3/4	100	99 3/4	1,129
Edison E. Ill. Co	126 1/2	125 3/4	127	126	127 1/2		128	127					1,955
Edison Gen. El	108 1/2	105 1/2	108 3/4	107 1/2	107 3/8	107	107 1/2	105 1/2	108	106 3/4	106 3/8	106 3/8	118,586
Nat. Cord. Co	67 1/2	65	68	67 1/2	68 1/4	67 1/2	67 3/4	65 3/8	68 3/8	67 1/8	68 1/8	67 1/2	11,142
do. pref	109	108 3/4	109 3/4	109 1/4	110 1/4	109 1/2	110 1/4	109 1/2	110 1/8	110			4,000
do. New													
Nat. Lead Co	43 3/4	42	44 1/8	43 3/8	43 3/8	43	44	43 3/8	43 1/2	42 3/4	42	41 1/2	27,969
do. pref			86 1/2		86 1/2		86 7/8		87 3/4	87			900
Nat. Linseed Oil	37		37						37				500
So. Cotton Oil													
U. S. Express			62 1/2		64 1/4	64	64 1/2		64				340
U. S. Rubber	53 1/2	51 1/2	55 1/2	53 7/8	59	55 1/2	58 3/4	57 1/4	58	56 3/8	56 1/2	55 1/4	7,942
do. pref	98		97 3/4	97	97 3/8	97 1/4	97						921
Wells, Fargo Ex			149										
Western Union	94 3/4	94 1/2	94 7/8	94 1/2	94 1/2	94	95 7/8	94 3/8	96 3/8	95 3/8	95	95 1/2	26,232

Total sales, 412,872

COLORADO.

Aspen. April 1.

	Bid.	Asked
Argentum Juniata	$0.68	$0.70
Aspen Contact	1.10	1.25
Aspen Deep Mining	.12	.13
Best Friend	.09	.10
Bi Metallic	.11	.12
Bushwacker	.18	.20
Delia S.	1.90	2.00
Gold Valley Placer		.15
Little Annie	.08	.09
Mollie Gibson	7.60	7.80
Pontiac	.09	.10
Smuggler	17.00	17.50
St. Joe & Mineral Farm		
U. S. Paymaster		.20

CALIFORNIA.

San Francisco.

NAMES OF STOCKS.	CLOSING QUOTATIONS.					
	Mar. 31.	April 1.	April 3.	April 4.	April 5.	Apr. 6.
Alpha						
Alta	.15	.20	.15	.15	.15	.25
Belcher	1.00	1.05	1.00	1.00	1.15	1.05
Belle Isle						
B. & Belch	1.30	1.30	1.30	1.35	1.40	1.40
Bodie	.30	.30	.30	.30	.30	.30
Bulwer	.40	.35	.30	.30	.30	.30
Challar	.55	.55	.60	.55	.55	.55
Com'w'lth	.05	.05		.05	.05	.05
Con. C. & V.	2.35	2.35	2.20	2.35	2.25	2.25
Con. Pac.						
Crown Pt.	.75	.75	.75	.70	1.00	1.00
Del Monte						
E'reka Con						
G'ld & C'y	.60	.65	.55	.60	.65	.65
Hale & N.	1.00	.95	.90	1.00	.95	.95
M. White						
Mexican	1.25	1.25	1.25	1.25	1.30	1.35
Mono	.25	.25	.30	.20	.20	.20
Mt. Diablo						
Navajo						
Nev. Qu'n			.05	.05		
N. B'lle Isle	.10	.10				
N. Co'w'th						
Ophir	1.50	1.50	1.40	1.45	1.50	1.50
Potosi	1.50	1.45	1.45	1.50	1.50	1.45
Savage	.55	.55	.50	.50	.50	.55
Sierra Nev	.90	.90	.85	.90	.95	.90
Uni'n Con	.70	.75	.70	.70	.75	.70
Utah	.05	.05	.05	.05	.05	.05
Yel. Jack	.35	.50	.50	.45	.70	.65

Colorado Springs. April 1.

	Bid.	Asked.
Anaconda Gold	.37	.40
Calumet	.08 1/4	.09
Cleopatra	.13	.15
Fanny Rawlins	.21	.23
Gold & Globe	.07	.08
Gold King	.18	.19
Isabella	.21	.22
Jack Pot	.02	.02 1/2
Jeff Davis	.02	.04
Lemhi	1.25	
Matoa	.07	.08
Ophir	.10	.11
Orphan Bell	.05	.06
Pharmacist	.20	.25
Summit M. & M	.24	.28
Work	.08 1/4	.09 1/2
World	.05	.05 1/2

Denver.

Prices and sales for the week ending April 1st:

	High.	Low.	Sales.
Anaconda	$0.40	$0 33	15,700
Amity	.01 1/2	.01	11,800
Bangkok-Cora Belle	.05 1/2	04 1/2	7,600
Brownlow	.03	.03	4,000
Calumet	.08 1/4	.07 1/2	32,600
Claudia J	.02	.01 1/4	15,100
Clay Co	.01 1/2	.01 1/2	1,000
Gold Rock	.05 1/2	.05 1/4	200
Ironclad	.04	.04	1,500
Justice	.02	.01 3/4	1,000
Work	.08	.07	15,800
Total sales			105,700

Rico. April 1.

Atlantic Cable Cons. M. Co	$0.25
Atlantic Cable guaranteed	.70
Enterprise Mining Co	3 50
Iron Dollar Silver Mines Co	.25
Southern Cons. Treasury Stock	.20
Uncle Ned Co	.35

MARYLAND.

Baltimore. April 6.

COMPANY.	Bid.	Asked.
Balt. & N. C.		.10
Conrad Hill		.10
Cons. Coal	.28	.33
Diamond Tunnel		.30
George's Creek Coal.	1.00	1.06 1/2@1.07
Howard C. & C.	1.10	
Lake Chrome		.05
Silver Valley	.72@.80	.80

MINNESOTA.

Duluth. March 17.

LISTED STOCK.

	Par.	Bid.	Asked
Biwabik M. Iron Co	100	28.50	32.00
Cincinnati Iron Co	25	1.05	1.10
Clark Iron Co	100	.40	.75
Cosmopolitan Iron Co		.15	
Great Northern Min. Co.	100	10.35	10.50
Kanawha Iron Co	100	1.65	1.75
Keystone Iron Co		.15	.60
Lake Superior Iron Co	25	3.00	3.80
Lincoln Iron Co		.40	.75
Little Mesaba Iron Co	100	1.50	4.00
Mountain Iron Co	100	75.00	85.00
Minneapolis Iron Co	100	.15	.50
Mesaba Moun. Iron Co.	100	19.00	19.50
Shaw Iron Co	100	4.75	5.00
Security Land & Exp. Co.	10	22.00	30.00
Washington Iron Co	100	.15	1.00

UNLISTED STOCKS.

Adams Iron Co		3.00	
Allegheny Iron Co	10	.02 1/2	.05
Aurora Iron Co			1.00
Buckeye Iron Co	100	2.00	
Chandler Iron Co			45.00
Chicago Iron Co	100	.70	1.50
Charlestoa Iron Co	100	1.65	1.75
Champion Iron Co	100	.35	.40
Comstock Iron Co	100	.10	
Columbia Iron Co	100		1.00
Camden Iron Co			.25
Cleveland Iron Co		.04	.06
Dayton Iron Co	100	.15	
Detroit Iron Co	25	.07	.07 3/4
Elmira Land & Iron Co		.20	.25
Great Western Mining Co.	100	4.45	4.60
Hall Iron Co			1 00
Horton Mining Co	10	.06	.25
Homestead Iron Co	25	.05	.10
Imp. Iron Mt. Mining Co			.50
Kentucky Iron Co	100	.25	
Kakina Iron Co	25		2.00
Lackawanna Iron Co.	100	1.05	1.20
McCaskill Mining Co		.07	.10
McKinley Iron Co	100	28.50	
Mesaba Chief Iron Co	100	8.00	8.50
Mesaba Iron Co		.20	.85
Mesaba Mineral Co			.75
Myrna Iron Co	10		.25
Northern Light Iron Co	100	.10	.50
New England Iron Co	100		2.00
Ohio Mining Co	100	10.00	11.50
Oneota Iron Co	100	.20	.50
Pennsylvania I. & S. Co.	100	.25	.40
Pioneer			1.00
Putnam			.80
Rouchleau Iron Co	100	.90	1.00
Republic Iron Co	25	.60	.75
Red Hematite Iron Co	100	.05	
Standard Ore Co	25	.70	1.25
Towanda Iron Co	100	1.95	2.50
Zenith Iron Co	25	2.00	3.00

MISSOURI.

St. Louis. April 5.

Closing quotations:

	Bid.	Asked.
Adams	.85	
American & Nettie, Colo	.30	
Bi-Metallic, Mont		7.25
Elizabeth, Mont	42 1/2	.46 1/4
Granite Mountain, Mont	5.00	5.75
Hope		3.75
Leo	.03 1/2	.04 1/2
Pat Murphy	.04 1/2	.05
Small Hopes	.75	

MONTANA.

Helena.

Prices for the week ending March 25th:

	High.	Low.
Bald Butte (Mont.)	$2.50	$2.25
Benton Group (Neihart), Mont.	27 1/2	.22
Combination (Phillipsb'g), Mont.	1.35	1 15
Cumberland (Castle), Mont.	.25	.15
Elizabeth (Phillipsb'g), Mont.	.50	.47 1/2
Florence (Neihart)	.20	.17 1/2
Helena & Victor, Mont.	.60	.50
Iron Mountain (Missoula), Mont	.90	.80
Poorman (Cœur d'Alene), Idaho	.60	.50
Whitlach Union & MacIntyre	.50	.40
Yellowstone	.15	.12 1/2

(Special report by F. M. DAVIS.)

PENNSYLVANIA.

Pittsburg. April 5.

	Bid.	Asked.
Bridgewater Gas Co	27.00	40.00
Chartiers Val. Gas	10.00	11.00
Enterprise Mining Co	1.50	2.50
Hidalgo Mining Co	5.50	6.50
La Noria Mining Co	.10	
Luster Mining Co	8.88	9.50
Manufacturers' Gas		30.00
N. Y. & Clev. G. D.	51.00	51 50
Pennsylvania Gas		10.25
People's N. G. & P. Co.	16.63	16.75
Philadelphia Co.	21.38	21.50
South Side Gas		26.00
Tuna Oil		20 00
Wheeling Gas Co	22 63	23 00
W'house Air Brake Co	134.50	136.00

Philadelphia. April 6.

	Bid.	Asked.
Bloomington C. & C.		
Buck Mountain C.		
Cambria	73	74
Connellsville Gas Co.		
Excelsior B. & S.		
Locust Mt. C. & I.		
Penn. Salt	102 1/2@103	
Penn. Steel	122 @122	
Penn. Gas Coal		
Royal Gas		
Westmoreland C.	70	

SOUTH DAKOTA.

Deadwood. Mar. 2.

	Bid.	Asked.
Deadwood Terra	$1 50	$1.75
Double Standard	.22	.25
Golden Reward	1.40	1.50
Hawkeye	.62	.65
Iron Hill	.12 1/2	.15
Isadora	.25	.30
Mutual	.01 1/4	.01
Ruby Bell	.22	.25 1/2
Seg. Iron Hill	.01	.01 3/4
Tornado	.25	.30

Pipe Line Certificates.

Week Ending March 31.

	High.	Low.	Sales.
April 1			
" 3	68	67 3/8	17,000
" 4			
" 5			
" 6			
" 7			
Total sales in barrels			17,000

FOREIGN QUOTATIONS.

London. March 21.

	Highest.	Lowest.
Alaska Treadwell	£2 1/4	£2
Amador, Cal	1s. 3d.	9d.
American Belle, Colo.	2s. 3d.	1s. 9d.
Can. Phosphate, Can.	£1/2	£1/4
Colorado, Colo	£1/8	
De Lamar, Idaho	£1 7-16	£1 5-16
Dickens Custer, Idaho.	7 1/2d.	4 1/2d.
Eagle Hawk		
Eberhardt, Nev	£1/8	
Elkhorn, Mont	£1 5-16	£1 3-16
Emma, Utah	1s.	9d.
Esmeralda, Nev		
Flagstaff, Utah	10 1/2s.	7 1/2s.
Golden Leaf, Mont		
Jay Hawk, Mont	9s.	8s.
La Luz, Mex	1s.	6d
La Plata, Colo	1s.	9d.
Maid of Erin, Colo	£1/2	£1/4
Mammoth Gold, Ariz.	1s. 3d.	1s.
Montana, Mont.	3s. 6d.	2s. 6d.
Mount McClellan	4s.	3s.
New Consolidated		
New Guston, Colo	14s.	13s.
New Hoover Hill, N.	2s. 6d.	
New Russell, N. C		
New Viola, Idaho		
Old Lout, Colo		
Parker Gold, N. C		
Pittsburg Cons., Nev	2s. 6d.	1s. 6d.
Plumas Eureka, Cal.	11s.	9s.
Poorman, Idaho	8s.	7s. 6d.
Richmond Con., Nev.	£1/2	£1/4
Ruby, Nev.	6d.	3d.
Sierra Buttes, Cal.	7s.	5s.
" Plumas Eur., Cal.	£9-16	£7-16
Silver King		
United Mexican, Mex.	2s. 6d.	1s. 6d.
Yankee Girl, Colo.	1s. 9d.	1s. 3d

Paris. March 23.

	Francs.
Belmez, Spain	625.00
Golden River, Cal	130.00
" " parts	30.00
Laurium, Greece	635.00
Lexington, Mont	95.90
" parts	2.25
Nickel, New Caledonia	720.00
Rio Tinto, Spain	391.25
" " oblig.	517.00
" " 2d	512.5
Tharsis, Spain	117.5
Vieille-Montagne, Belgium	528.7

ASSESSMENTS.

COMPANY.	No.	D'l'nqt in office.	Day of sale.	Amt. per sh're.
Anchor, Utah	17	Mar. 27	April 17	.20
Belle Isle, Nev.	18	April 24	May 25	.10
Bodie, Cal	15	Mar. 16	Apr. 17	.25
Challenge, Nev.	14	Mar. 16	Apr. 17	.25
Con. Imp'l, Nev.	35	April 26	May 17	.0
Con. St. Gothard, Cal	7	Mar. 17	May 6	.05
Crown Pt., Nev.	60	Mar. 26	Apr. 20	.25
Delhi, Cal	3	Apr. 12	May 3	.10
Goleta	2	April 22	May 16	.05
Greeley, Utah		April 5		.01
Himalaya, Ut'h	12	Mar. 24	April 17	.00 1/2
Independence	18	Feb. 27	Apr. 29	.05
Jack Rab'it, Cal	3	May 2	May 22	.05
Jackson, Nev	14	April 29	May 22	.20
Mexican, Nev.	47	Apr. 16	May 11	.25
Muldoon, Utah		April 10	April 25	.01
Navajo	25	April 24	May 22	.10
New S. Crown, Mont		April 12	May 3	.02
Occidental, Nev	12	April 17	May 11	.25
Ophir, Nev.	59	April 7	May 1	.50
Pine Hill, Cal.	2	April 27	May 24	.03
Savage, Nev.	80	April 16	May 9	.50
Sierra Nevada	101	April 9	May 1	.25
Silver Hill, Nev	32	Mar. 21	Apr. 11	.05
Teresa, Mex.	10	April 1	Apr. 19	.10
Tintic, Utah	1	Feb. 20	April 17	.00 1/2
Union Con.	47	April 16	May 11	.25
Utah Con., Nev.	17	April 26	May 15	.10
Yellow Jacket	54	April 10	May 19	.25